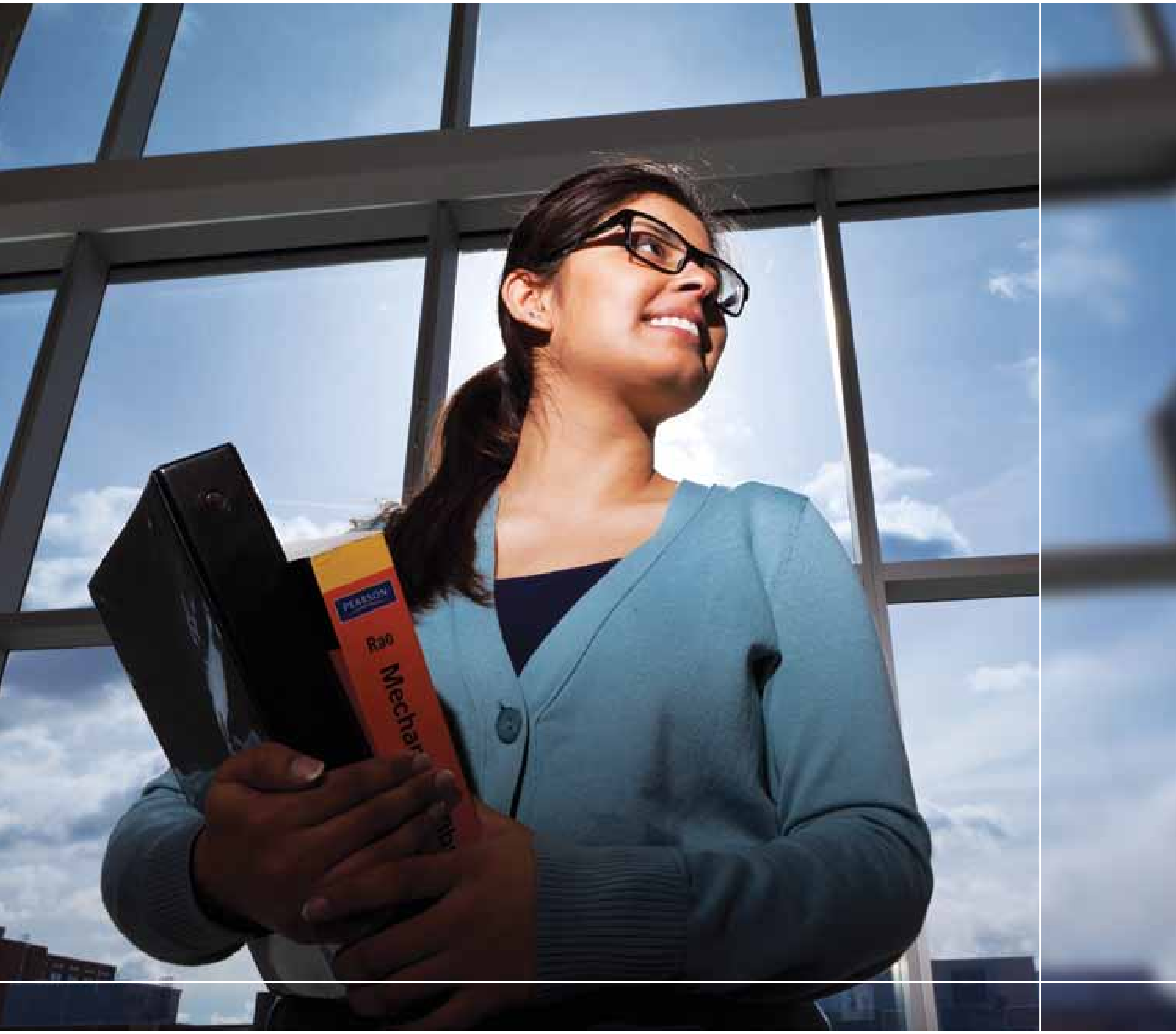
UNIVERSITY OF ONTARIO INSTITUTE OF TECHNOLOGY



UOIT
CHALLENGE INNOVATE CONNECT

UNDERGRADUATE ACADEMIC CALENDAR
AND COURSE CATALOGUE 2011–2012

UOIT

CHALLENGE INNOVATE CONNECT

Undergraduate Academic Calendar and Course Catalogue 2011–2012

PUBLISHED BY THE UNIVERSITY OF ONTARIO INSTITUTE OF TECHNOLOGY, OSHAWA, ONTARIO
MAY 2011

OUR VISION

The University of Ontario Institute of Technology (UOIT) is an innovative and market-oriented institution, pursuing inquiry, discovery and application through excellence in teaching and learning, value-added research and a vibrant student life.

OUR MISSION

The mission of UOIT is to:

- Provide career-oriented undergraduate and graduate university programs with a primary focus on programs that are innovative and responsive to the needs of students and employers;
- Advance the highest quality of research;
- Advance the highest quality of learning, teaching, and professional practice in a technologically enabled environment;
- Contribute to the advancement of Ontario and Canada in the global context with particular focus on Durham Region and Northumberland County;
- Foster a fulfilling student experience and a rewarding educational (work) environment; and
- Offer programs with a view to creating opportunities for college graduates to complete a university degree.

IMPORTANT NOTICE

UOIT reserves the right to make changes to the information contained in this calendar, in its printed or electronic form, without prior notice. Though all reasonable efforts are made to ensure the publication of accurate information, the university does not warrant that all general information and course references are accurate.

In the event of an inconsistency between this calendar and the regulations and policies established by the faculties, Academic Council or university Board of Governors, the regulations and policies established by the faculties, Academic Council and Board of Governors shall prevail.

Not every course listed in this calendar will necessarily be available every year. Lists of available courses are provided on the university website **www.uoit.ca**. The university reserves the right to limit access to courses or programs, and at its discretion, to withdraw particular programs, options or courses altogether. In such circumstances, the university undertakes to the best of its ability to enable students registered in affected programs to complete their degree requirements.

The regulations and policies published herein apply only for the academic year indicated on the cover page of the publication.

Students have a responsibility to:

- Familiarize themselves with degree requirements;
- Familiarize themselves with the regulations and policies of the university and its faculties; and
- Ensure they register for the courses necessary to satisfy their degree requirements.

Students agree by the act of registration to be bound by the regulations, policies and bylaws of UOIT that are in effect at the time of registration.

Protection of privacy

UOIT collects and retains student and alumni personal information under the authority of the UOIT Act (2002). The information is related directly to and needed by the university for the purposes of admission, registration, graduation and other activities related to its programs.

The information will be used to admit, register and graduate students, record academic achievement, issue library cards, and administer and operate academic, athletic, recreational, residence, alumni and other university programs.

Information on admission, registration and academic achievement may also be disclosed and used for statistical and research purposes by the university, other post-secondary institutions and the provincial government.

Personal information provided for admission and registration and any other information placed into the student record will be collected, protected, used, disclosed and retained in compliance with Ontario's Freedom of Information and Protection of Privacy Act (R.S.O. 1990, c. F.31).

In addition to collecting personal information for its own purposes the university collects specific and limited personal information on behalf of Your SA (student association). Your SA uses this information for the purpose of membership administration, elections, annual general meetings and its health plans. The university discloses the personal information to the student association only for those purposes. Please contact Your SA office if you have any questions about its collection, use and disclosure of the information. T: 905.721.1609, E: sa@dc-uoit.ca.

If you have any questions about the collection, use and disclosure of your personal information by the university, please contact the director, Human Resources, 2000 Simcoe Street North, Oshawa ON L1H 7K4, T: 905.721.8668.

Notification of disclosure of personal information to Statistics Canada

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

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

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

Further information on the use of this information can be obtained from Statistics Canada's website at **www.statcan.gc.ca/concepts/psis-siep/contact-eng.htm** or by writing to:

Institutional Surveys Section
Centre for Education Statistics,
Statistics Canada, Main Building, SC 2100-K
Tunney's Pasture, Ottawa, Ontario, Canada K1A 0T6

MESSAGE FROM THE PRESIDENT

Welcome to UOIT! We're delighted that you are pursuing your post-secondary future here.

As you read through the pages of our annual Undergraduate Academic Calendar and Course Catalogue you will discover more about our leading-edge learning environment and our deep commitment to providing students with an outstanding and well-rounded educational experience. UOIT graduates are armed with the knowledge, skills and experience needed for successful entry to business, industry, the public sector or further education – wherever they may want to go next.

Since opening our doors in 2003, UOIT has experienced tremendous growth and we continue to expand our numbers, innovative programs and vibrant campus. Our 2010-2011 academic year welcomed more than 7,400 undergraduate and graduate students. These young men and women will learn from globally experienced professors who challenge and inspire students to push their own boundaries of thinking and learning. Our student body includes students from more than 65 different countries, we have a wonderfully diverse and exciting campus environment.

At UOIT, we're pleased to offer an exceptional array of undergraduate and graduate programs, many of them unique to Ontario and even Canada, and new programs are continuously being developed to meet the demands of today's knowledge-driven economy. The 2010-2011 academic year introduced a number of new undergraduate and graduate programs in niche areas such as the Bachelor of Arts (Honours) in Community Development; Bachelor of Arts in Forensic Psychology; a Human Health Biology field in the Master of Science in Applied Bioscience program; Design field in the Master of Applied Science and Master of Engineering in Mechanical Engineering programs; Master of Engineering – UNENE administered program; Kinesiology field in the Master of Health Sciences program; PhD in Nuclear Engineering; PhD in Modelling and Computational Science; and a PhD in Materials Science. We also introduced the Nuclear Power Bridge program to our growing list of bridge programs, which are designed to help our students turn their college diplomas into a university degree in their chosen field of study.

To further support our innovative programs, we are also advancing the technology we use and building additional state-of-the-art facilities for our students. The General Motors of Canada Automotive Centre of Excellence, the new Energy Research Centre and Clean Energy Research Laboratory give students access to the latest technology and hands-on experience that will put them ahead of the rest upon graduation and in demand by employers. As a result of our continued growth, UOIT has expanded its campus to the core of downtown Oshawa. Our downtown location now includes our high-tech Faculty of Education and Faculty of Social Science and Humanities buildings and our new lecture hall, the historic Regent Theatre.

We hope that you chose to come to UOIT because our innovative programs are an excellent match for your interests, ambitions and desire to find your best fit in the workplace or academic world. Our technology-based teaching and learning programs are key to ensuring that you will excel in today's knowledge-driven economy and master whatever challenges the future holds.

At UOIT, our goal is to provide you with the very best education possible, helping you to achieve your greatest potential and contribute to the making of a better world.

I encourage you to spend time getting to know the campus, continue to visit **www.uoit.ca** and take advantage of all the exciting opportunities available to you during your time with us. I am delighted to have you here!

Sincerely,

Dr. Ronald Bordessa
President and vice-chancellor

May 2011

GLOSSARY OF TERMS USED IN THIS CALENDAR

Academic standing:	A student's official status of enrolment at the university as evaluated at the end of each semester; used to assess whether students are meeting the standards prescribed for continuing in the university and/or their programs.
Academic year:	The period from September 1 to August 31.
Appeal:	The request for review of a judgment regarding the application of regulations.
Auditing student:	A student attending classes but not receiving credit for courses. Auditing students will be charged full course fees. No indication of an audited course is given on an official transcript.
Award:	A general term used to mean any presentation, monetary or otherwise, made to student.
Bursary:	A monetary award given to a student where the primary criterion is financial need.
Challenge for credit:	The request for academic credit resulting from experience or knowledge gained elsewhere for which transfer credit cannot be awarded.
Concentration:	A prescribed set of courses in a particular discipline that a student may take out of interest or for purposes of external accreditation that do not result in the award of a formal credential.
Corequisite:	A course that must be taken concurrently with the course for which it is required.
Course:	A unit of work in a particular subject normally extending through one semester or session, the completion of which carries credit toward the requirements of a degree.
Credit hour:	The measure used to reflect the relative weight of a given course toward the fulfilment of degree requirements. Unless otherwise indicated, a course normally has a credit hour value of three.
Credit restriction:	Where two or more courses are closely related, credit may be limited to one of the courses.
Cross-listed course:	A course that is listed under two or more faculties and can be taken for credit from one faculty only.
Degree:	A credential awarded upon successful completion of a set of required and elective courses as specified by a program in a particular faculty.
Exchange student:	A student participating in a formalized exchange program with another university. Such students normally pay fees at their home institution and take courses at the host institution.
Final examination:	Final examinations as referenced in the Undergraduate Academic Calendar and Course Catalogue should be interpreted in the ordinary sense of the word; usually covering all, or a very substantial portion of the material dealt within one academic term.
GPA:	The abbreviation for grade point average. A semester GPA is the weighted average of the grade points awarded on the basis of academic performance during a single semester. A cumulative GPA is the weighted average of the grade points awarded in all courses completed by a student at the university.
Major:	A prescribed set of courses within a program, normally requiring at least 30 credit hours of study.
Minor:	A prescribed set of courses within a program, normally requiring at least 18 credit hours of study in a particular field.
Prerequisite:	A course that must be successfully completed prior to commencing a second course for which it is required.
Registration:	The process of selecting, enrolling in, and being assessed fees for courses.
Registration period:	In a semester, the period extending from the first day of registration to the 10th lecture day, as stated in the academic schedule. In a session, it is the period extending from the first day of registration to the fifth lecture day.
Scholarship:	A monetary award to a student based primarily on academic merit, although other criteria may be considered based on donors' requirements.

Semester:	Sixty-four days of lectures and an examination period.
Session:	A period of approximately seven consecutive weeks in the summer semester consisting of 32 days of lectures. The first half of summer semester is designated as spring session; the second half is designated as summer session.
Special student:	A student taking courses but not seeking a degree. With the permission of the dean, such a student may subsequently be admitted to a degree program in which case courses already taken may be used to satisfy undergraduate degree requirements. Special students register formally in courses, with the consent of the instructor; such students submit assignments, write examinations, receive grades and may request an official transcript. Such students are charged full course fees.
Specialization:	An increased depth of study in a particular field within a major program.
Transcript:	The complete report of a student's academic record.
Transfer credit:	Academic credit granted for work completed at an institution other than UOIT.
Visiting student:	A student admitted to another post-secondary institution, attending UOIT on a letter of permission.
Waiver:	Permission granted by the appropriate authority for exemption from a particular program requirement and/or a particular university regulation.

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SECTION 1: GENERAL INFORMATION

1.1 History of the university

For more than 10 years, prominent Durham Region leaders worked to realize their vision for a student-focused institution dedicated to great teaching, groundbreaking research and the use of leading-edge learning technology. By preparing students for critically needed, knowledge-intensive careers, the university would ensure bright futures for its graduates and generate economic growth for Durham Region, Northumberland County and all of Ontario.

In one of Ontario's earliest efforts to combine university and college studies in one location, the Durham University Centre was created in 1996 on the campus that UOIT shares with Durham College. Courses offered at the centre were taught by professors from both Trent and York universities. However, despite this notable achievement, the unique vision for UOIT remained strong.

May 9, 2001 marked a historic day for Durham Region and Northumberland County when the Ontario government announced plans for the province's first new university in 40 years and earmarked $60 million in start-up funds through the Ontario SuperBuild Corporation. An operations centre was set up next to the President's office, where 11 teams who worked seven days a week, produced a to-do list of 856 tasks and hundreds of subtasks. Team members toured top institutions across North America to study best practices.

UOIT officially came into being on June 27, 2002, with the provincial legislature's passage of Bill 109, Schedule O, the University of Ontario Institute of Technology Act, 2002, and in September 2003, it welcomed its first class of 947 students. By September 2010, its award-winning campus had grown to just over 7,400 undergraduate and graduate students driven by a common desire for excellence and innovation.

From an academic perspective, professors at UOIT are experts in their fields from around the world who challenge and inspire students to push their boundaries of thinking and learning. The university's commitment to research excellence sees students collaborate with professors in the classroom, the lab, and the field, to turn innovative ideas into real solutions designed to make an impact on society.

UOIT's short history has been marked by tremendous accomplishment and growth and an exciting future lies ahead. The university's first two state-of-the-art academic buildings – the Science and Business and Information Technology buildings – as well as its architecturally award-winning Campus Library were completed by Fall 2004. The Ontario Power Generation Engineering building opened in 2006 and the 90,000-square-foot Campus Recreation and Wellness Centre opened in June 2007. UOIT has also expanded north across Conlin Road, thanks to the estate of industrialist E.P. Taylor and the donation of a portion of Windfields Farm; a world-class thoroughbred racing operation that once nurtured the great champion, Northern Dancer. On this land stands the Campus Ice Centre and the year-round Campus Tennis Centre.

In Fall 2008, the university expanded once again when it opened its first downtown Oshawa location, which is home to the Faculty of Education.

In November 2009, UOIT assumed ownership of the historic Regent Theatre as its new lecture hall and agreed to lease a new 30,000-square-foot, five-storey building, which is directly north of the Regent Theatre, for classroom, lab, office and other learning areas. The new facility, located in downtown Oshawa, is home to the Faculty of Social Science and Humanities, which is growing in size and reputation. In addition, the university signed a 30-year lease for use of the former Alger Press building, located on Charles Street immediately east of the General Motors Centre. This building is also utilized by UOIT's Faculty of Social Science and Humanities. Being situated in the heart of the city is an ideal fit for a faculty dedicated to preparing its students to be critical thinkers and social justice innovators.

To further support UOIT's expansion efforts, the university received $73.4 million in funding from both the federal and provincial governments towards the construction of two buildings at the north Oshawa location, the General Motors of Canada Automotive Centre of Excellence (ACE) and the Energy Research Centre (ERC). The funding was received as part of the joint federal and provincial Knowledge Infrastructure Program.

ACE, scheduled to open in 2011, will provide faculty, staff, students and industry partners with access to what will be the first commercial automotive research, development and innovation centre of its kind in the world. Among its many key design and testing features, the 16,300-square-metre centre will be home to a climatic wind tunnel with extreme weather capabilities.

The new ERC, a 9,290-square-metre training and research facility, is also scheduled to open in 2011. It will serve as the premier training ground for future energy scientists and nuclear engineers while enabling leading-edge research in the development of clean and green energy and technology.

1.2 Mobile learning environment

UOIT's leading-edge mobile learning environment enables students to connect with professors and peers at any time and from any place, putting them one step ahead come graduation.

In fact, UOIT's state-of-the-art Mobile Learning program is so highly regarded for the advantages it provides to students and faculty that it has received national acclaim as the recipient of a prestigious Silver Award of Excellence in the category of Organizational Transformation from the Canadian Information Productivity Awards program.

At Ontario's first laptop-based university, all students use a high-end Lenovo ThinkPad laptop, loaded with the latest program-specific software. Professors develop sophisticated course content using a powerful campus-wide online Learning Management System.

One of the greatest advantages of the Mobile Learning program is that students have equal access to the same technology, resources and services, inside or outside of the classroom. Students make quality computer-based presentations, conduct Internet research, work electronically on their own or with other students and have seamless access to all online resources.

An annual mobile-computing fee covers:

- A wide range of educational software tailored specifically to each program;
- Extensive technical support;
- Free printing services;
- The use of hardware learning tools;
- High-speed Internet;
- Insurance; and
- Virus protection.

In addition, all laptops are refreshed with the appropriate program-based software every year and upgraded every two years. UOIT is committed to giving students even more value for their education and investment in technology.

The university's Student Laptop Ownership program is available to any student who is graduating or completing their final year of a full-time, multi-year program of study. Once they have paid for their final year of study, they can purchase a laptop for $1.

1.3 Libraries

www.uoit.ca/library

The UOIT libraries provide extensive print and digital information resources and services to assist you.

The libraries are located at:

- 2000 Simcoe Street North;
- 11 Simcoe Street North for Faculty of Education students; and
- 61 Charles Street for Faculty of Social Science and Humanities students.

Wireless connections, free interlibrary loan, streaming media, specialized training sessions and one-on-one consultations are available in each library. We encourage you to contact the library for assistance.

SECTION 2:
ACADEMIC SCHEDULE 2011-2012

FALL TERM

August 22, 2011	Start date for consecutive and fifth-year concurrent education.
August 29, 2011	Lectures begin for Primary/Junior (P/J), Intermediate/Senior (I/S) consecutive education and fifth-year concurrent education students, fall semester.
September 5, 2011	Labour Day, no lectures.
September 6 to September 7, 2011	Fall semester orientation, first-year students.
September 6 to September 9, 2011	Field Experience I Observation Week for P/J, I/S consecutive education and fifth-year concurrent education students.
September 7, 2011	Deadline for payment of fees, fall semester.
September 8, 2011	Lectures begin, fall semester (includes concurrent education students in years one through four).
September 21, 2011	End of regular registration period; last day to add courses, fall semester.
	Last day to drop courses and receive a 100 per cent refund of tuition fees, fall semester.
October 1, 2011	Last day to submit online application for graduation for students completing degree requirements at the end of the summer semester.
October 5, 2011	Last day to withdraw from fall semester courses without academic consequences (i.e. without receiving a grade). Courses dropped after this date will be recorded on the academic transcript with a grade of W to indicate withdrawal.
	Last day to drop courses and receive a 50 per cent refund of tuition fees, fall semester.
October 10, 2011	Thanksgiving Day, no lectures.
October 11 to October 28, 2011	Field Experience Practicum I for P/J, I/S consecutive education and fifth-year concurrent education students.
November 15, 2011	Last day to withdraw from fall semester courses. As of November 16, 2011 students may not drop courses or withdraw. Active fall semester courses will be graded by instructors.
November 24, 2011	Last day of classes for Bachelor of Education (P/J, I/S consecutive and fifth-year concurrent education) students, fall semester.
November 28 to December 16, 2011	Field Experience Practicum II for P/J, I/S consecutive education and fifth-year concurrent education students.
December 7, 2011	Last day of lectures, fall semester.
December 9 to December 21, 2011	Fall semester final examination period. Students are advised not to make commitments during this period (i.e. vacation, travel plans).
December 24, 2011 to January 1, 2012	University closed.
December 31, 2011	Last day to submit online application for graduation for students completing degree requirements at the end of the fall semester.

WINTER TERM

January 2, 2012	University re-opens.
January 9 to January 13, 2012	Winter term start days for all consecutive and fifth-year concurrent education students.
January 9, 2012	Lectures begin, winter semester.
	Deadline for payment of fees, winter semester.
January 20, 2012	End of regular registration period; last day to add courses, winter semester.
	Last day to drop courses and receive a 100 per cent refund of tuition fees, winter semester.
February 3, 2012	Last day to withdraw from winter semester courses without academic consequences (i.e. without receiving a grade). Courses dropped after this date will be recorded on the academic transcript with a grade of W to indicate withdrawal.
	Last day to drop courses and receive a 50 per cent refund of tuition fees, winter semester.
February 20, 2012	Family Day, no lectures.
February 20 to February 24, 2012	Midterm break.
February 28, 2012	Last day to submit online application for graduation for the spring session of convocation for students completing degree requirements at the end of the winter semester.
March 16, 2012	Lectures end for P/J, I/S consecutive education and fifth-year concurrent education students, winter semester.
March 19 to April 25, 2012	Field Experience Practicum III for P/J, I/S consecutive education and fifth-year concurrent education students.
March 21, 2012	Last day to withdraw from winter semester courses. As of March 22, students may not drop courses or withdraw. Active winter semester courses will be graded by instructors.
April 6, 2012	Good Friday, no lectures
April 13, 2012	Lectures end, winter semester.
April 16 to 27, 2012	Winter semester final examination period. Students are advised not to make commitments during this period (i.e. vacation, travel plans).
April 30 to May 4, 2012	Field experience practicum for first-year concurrent education students.
April 30 to May 11, 2012	Field experience practicum for second-year concurrent education students.
April 30 to May 18, 2012	Field experience practicum for third-year concurrent education students.

SPRING/SUMMER SESSION

April 26, 2012	Culminating day for P/J, I/S consecutive education and fifth-year concurrent education students.
May 7, 2012	Lectures begin, summer semester, (including 14-week summer semester and seven-week spring session).
	Deadline for payment of fees, spring session and 14-week summer semester.
May 11, 2012	Last day to add seven-week spring session courses.
	Last day to drop seven-week spring session courses and receive a 100 per cent refund of tuition fees.
May 18, 2012	Last day to add course, 14-week summer semester.
	Last day to drop 14-week summer semester courses and receive a 100 per cent refund of tuition fees.

May 18, 2012 (continued)	Last day to withdraw from seven-week spring session courses without academic consequences (i.e. without receiving a grade). Courses dropped after this date will be recorded on the academic transcript with a grade of W to indicate withdrawal.
	Last day to withdraw from a seven-week spring session course and receive a 50 per cent refund of tuition fees.
May 21, 2012	Victoria Day, no lectures.
June 4, 2012	Last day to withdraw from 14-week summer semester courses without academic consequences (i.e. without receiving a grade). Courses dropped after this date will be recorded on the academic transcript with a grade of W to indicate withdrawal.
	Last day to drop 14-week summer courses and receive a 50 per cent refund of tuition fees.
June 8, 2012	Spring Convocation.
June 11, 2012	Last day to withdraw from seven-week spring session courses. As of June 12, students may not withdraw, or drop seven-week spring session courses. Active seven-week spring session courses will be graded by instructors.
June 20, 2012	Lectures end, seven-week spring session.
June 21 to June 24, 2012	Spring session final examination period (four days). Students are advised not to make commitments during this period.
June 25 to June 28, 2012	Midterm break, 14-week summer semester.
July 2, 2012	Canada Day, no lectures.
July 3, 2012	Lectures begin, seven-week summer session.
	Lectures resume, 14-week summer semester.
July 9, 2012	Last day to add courses, seven-week summer session.
	Last day to drop seven-week summer session courses and receive a 100 per cent refund of tuition fees.
July 16, 2012	Last day to withdraw from seven-week summer session courses without academic consequences (i.e. without receiving a grade). Courses dropped after this date will be recorded on the academic transcript with a grade of W to indicate withdrawal.
	Last day to drop seven-week summer session courses and receive a 50 per cent refund of tuition fees.
July 30, 2012	Last day to withdraw from 14-week summer semester courses.
	As of July 31 students may not withdraw or drop 14-week summer semester course. Active 14-week summer semester courses will be graded by instructors.
August 6, 2012	Civic Holiday, no lectures.
August 7, 2012	Last day to withdraw from seven-week summer session courses. As of August 8, students may not withdraw, or drop seven-week summer session courses. Active seven-week summer session courses will be graded by instructors.
August 16, 2012	Lectures end 14-week summer semester and seven-week summer session.
August 17 to August 20, 2012	Summer semester final examination period (includes seven-week and 14-week courses). Period spans four days inclusive. Students are advised not to make commitments during this period.

Note: Courses offered outside the normal teaching timeframe will have add/drop deadlines prorated accordingly. In such cases, faculties will advise students of appropriate deadline dates during the first meeting of the class.

SECTION 3: GOVERNING BODIES AND STAFF

3.1 Board of Governors

Chair

Peter Williams

Vice-chair

Larry Seeley

Members

Michael Angemeer

Perrin Beatty, Chancellor

David Broadbent

Gary Cubitt

Brian Cutler

Peter Dixon

Carlee Fraser

John Friedlan

Allan Furlong

Patricia MacMillan

Robert Marshall

Michael Martin

Doug McKay

R. Peter McLaughlin

Michael Newell

Ian Ngaira

Kevin Pope

Ann Stapleton McGuire

Gerry Warman

Heather White

Franklin Wu

Ron Bordessa, President (Ex-officio)

Marika McKetton, Secretary to the board

3.2 University officers

Chancellor

Hon. Perrin Beatty, BA

President and vice-chancellor

Ron Bordessa, BA, PhD, LLD (Hon)

Provost

Richard J. Marceau, BEng, MScA, PhD, PEng, FCAE

Associate provost, Research

Michael Owen, BA, MEd, PhD

Associate provost, Academic

Bill Muirhead, BEd, MEd, PhD

Associate provost and dean, Graduate Studies

Brian Campbell, BA, BPhil, PhD

Vice-president, External Relations

MaryLynn West-Moynes, BSc (Hons), MA

Vice-president, Operations and Strategic Development

Matt Milovick, MEd, CMA

Registrar

Victoria Choy, BA (Hons), MA

University librarian

Pamela Drayson, BA, MA, PhD

3.3 Deans

Dean, Faculty of Business and Information Technology

Pamela Ritchie, BA, MSc, PhD

Dean, Faculty of Education

Jim Greenlaw, Hon BA, BEd, MA(T), PhD

Dean, Faculty of Energy Systems and Nuclear Science

George Bereznai, BE (Hons), MEng, PhD, PEng

Dean, Faculty of Engineering and Applied Science

George Bereznai, BE (Hons), MEng, PhD, PEng

Dean, Faculty of Health Sciences

Mary Bluechardt, EMT, BPHE, MSc, PhD

Dean, Faculty of Science

William Smith, BASc, MASc, MSc, PhD, PEng

Dean, Faculty of Social Science and Humanities

Nawal Ammar, BSc (Hons), MSc, PhD

SECTION 4: UNDERGRADUATE ADMISSION

4.1 Application procedure

With the exception of part-time and special visiting students, all applicants apply to the University of Ontario Institute of Technology (UOIT) through the Ontario Universities' Application Centre (OUAC) at **www.ouac.on.ca**. Students attending an Ontario secondary school are normally informed of OUAC application procedures and deadlines through their schools in September. Part-time and special visiting students should complete an application form at **www.uoit.ca** to be submitted directly to the Registrar's office. Documents submitted to the Registrar's office become the property of the university and may not be returned to the student (see Section 5.13).

Delivery address:
UOIT Registrar's office
2000 Simcoe Street North
Oshawa, Ontario L1H 7K4

Mailing address:
UOIT Registrar's office
PO Box 385
Oshawa, Ontario L1H 7L7

E: admissions@uoit.ca
T: 905.721.3190
F: 905.721.3178

4.2 Application deadlines

Specific dates pertaining to the current year are provided on the university website at **www.uoit.ca**. Applications submitted after published deadlines will be considered on an individual basis. Applicants should consult the OUAC or their school guidance counsellors for more information.

4.3 Assessment of eligibility

The actual cut-off levels for admission cannot be determined until applications and grades are received. Preference will be given to students presenting the strongest admission averages. Students whose grades have been affected by exceptional circumstances that can be documented should refer to Section 4.10. Ontario universities support the full disclosure of all marks achieved in all attempts at secondary and post-secondary school courses (see Section 4.12). UOIT will use the highest grade obtained in a course in the calculation of averages.

Applicants seeking information on the applicability of their educational backgrounds may seek informal guidance from the Registrar's office if their circumstances are straightforward. Applicants wanting a formal assessment of their credentials prior to application should contact a credential evaluation service. Official determination of admissibility cannot be made until the point of application and transfer credits will not be reviewed until after a student has accepted an offer.

4.4 Admission requirements for post-degree programs

4.4.1 Admission requirements for Bachelor of Education program (consecutive)

Primary/Junior (P/J) – see Section 10.2.2.1 of this calendar for details.
Intermediate/Senior (I/S) – see Section 10.2.2.2 of this calendar for details.

4.5 Admission requirements for undergraduate programs

Regardless of educational background, all applicants to undergraduate programs must have specific prerequisite subject knowledge for their intended program of study. The prerequisite subjects for each program and other program specific requirements are listed in the faculty sections of the Undergraduate Academic Calendar and Course Catalogue.

Current students and graduates of secondary schools (no post-secondary education) will be evaluated based on their secondary school courses. Students who have followed a secondary school curriculum other than those listed below are encouraged to visit **www.uoit.ca** or contact the Registrar's office for further information.

The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Note: Admission requirements are subject to change. The admission requirements listed in the 2011-2012 Undergraduate Academic Calendar and Course Catalogue were the requirements for admission to UOIT for the 2011-2012 academic year. Applicants seeking admission to UOIT for an academic year other than 2011-2012 should visit **www.uoit.ca** for specific admission requirements.

4.5.1 Applicants from Ontario secondary schools

Applicants must have an Ontario Secondary School Diploma with a minimum of six 4U or 4M credits or equivalent, including credits and courses to satisfy the academic prerequisites of specific programs and present a competitive admissions average.

4.5.2 Applicants from secondary schools in other Canadian provinces

Specific information on admission requirements for students completing high school in other provinces can be viewed online at **www.uoit.ca**. The normal minimum requirement consists of meeting the necessary academic program requirements, presenting a competitive admissions average and completion of secondary school.

4.5.3 Applicants from secondary schools in other countries

Applicants from the United States must achieve high school graduation with a competitive admissions average including the prerequisite courses for the intended program of study. All applicants must present a SAT or ACT score. UOIT does not accept scores more than five years after the test date. UOIT's SAT code is 4192.

Applicants from other countries should visit the UOIT website at **www.uoit.ca** for admission requirements specific to their curriculum.

4.5.4 International Baccalaureate students

Full diploma candidates who achieve passes in six subjects with at least three at the Higher Level, and who accumulate a grade total of 24 with no score lower than 4 are eligible for admission to first year. Students must hold the appropriate prerequisite subjects at the Higher Level. English may be held at either Higher or Standard Level. Applicants offering prerequisites at Standard Level will be given individual consideration. See Section 4.6 for information on advance standing.

4.5.5 Students applying from other colleges and universities

Transfer students must present a competitive average in the specific prerequisite subjects for their intended program of study. The prerequisite subjects for each program are listed in the faculty sections of this calendar. Prerequisite subject requirements may be met by a combination of secondary and post-secondary studies. Applicants must be in good academic standing at their previous post-secondary institution.

4.5.6 Mature applicants

A mature applicant is defined as one who meets all of the following criteria:

- Has not completed any post-secondary education;
- Has been away from formal education for at least two years;
- Will have reached the age of 21 by December 31 of the year of application;
- Is a Canadian citizen or permanent resident; and
- Is not eligible for admission as a secondary school graduate.

Mature applicants may be admitted upon successful completion of secondary-level courses in the prerequisite subjects for their intended program of study and must present a competitive admissions average.

4.5.7 Visiting students

With a letter of permission from a recognized institution, a student studying elsewhere may be allowed to enrol in UOIT courses, subject to availability. In some instances the letter of permission may be used in lieu of transcripts from their home institution; however, some faculties require the submission of academic transcripts. As a result, it is the responsibility of the student to ensure they have the necessary prerequisites and are academically prepared for the course. These students will be admitted as special students not seeking a degree and will be subject to the applicable application and letter of permission deadlines and fees.

4.5.8 Home-schooled applicants

Home-schooled applicants will be evaluated on the basis of examinations (through distance learning or alternative education centres) or on a combination of SAT Subject Tests and a portfolio. Parent-generated transcripts will be accepted as a reflection of courses completed and marks attained, but these transcripts must be submitted in conjunction with standardized test scores. Applicants who have completed courses through distance learning or alternative education centres should include marks from these courses at the time of application. If official transcripts like these indicate completion of specific prerequisite subjects then there is no need to submit SAT Subject Test scores or a portfolio.

Alternatively, applicants may write four SAT Subject Tests. A minimum score is required to demonstrate sufficient background in the subject. Below are the required SAT Subject Tests for each program.

Faculty of Business and Information Technology – Literature, Mathematics (Level II), two other SAT Subject Tests

Faculty of Energy Systems and Nuclear Science – Literature, Mathematics (Level II), Physics and Chemistry

Faculty of Engineering and Applied Science – Literature, Mathematics (Level II), Physics and Chemistry

Faculty of Health Sciences – Literature, Mathematics (Level II), Biology (Ecological or Molecular) and Physics or Chemistry

Faculty of Science – Literature, Mathematics (Level II), Biology (Ecological or Molecular) and Physics or Chemistry

Faculty of Social Science and Humanities – Literature, Mathematics (Level II), two other SAT Subject Tests

Applicants presenting SAT Subject Test scores must also submit a personal/career portfolio. This should detail personal and community participation and achievements including academic, volunteering and mentorship. The portfolio should also include an essay detailing future goals and reasoning for application to their program of choice. A letter of reference to support the application should also be submitted. For additional information, please contact admissions@uoit.ca. The university reserves the right to accept or deny students based on overall performance through the variety of measures listed above.

4.5.9 Readmission of former UOIT students

Students previously admitted to UOIT who have not been in attendance for a period of one academic year and have not received a deferral will be required to apply for readmission to the university. Applications for readmission are submitted directly to the Registrar's office and must be received by the deadline outlined at **www.uoit.ca**.

For admission following suspension, see Section 5.9.

4.5.10 Reinstatement of UOIT students following dismissal

Any student dismissed from the university under Section 5.9 may apply for reinstatement following a minimum rustication period of two calendar years. Reinstatement is at the discretion of the admitting faculty and is not automatic. The application must be accompanied by a statement explaining why the student believes they will now be successful. Applications for reinstatement may be obtained from the Registrar's office.

Students will not be permitted to take UOIT courses during the rustication period. Up to 6 credit hours of courses taken elsewhere during this period will be considered for transfer.

A student's GPA will not be reset upon reinstatement. Faculties may establish additional conditions for continuation beyond normal academic standing requirements.

Only one reinstatement request may be granted per student. Students who do not meet academic standing requirements following reinstatement will be permanently dismissed from the university with no possibility of subsequent reinstatement.

4.6 Advance standing

4.6.1 Secondary school students

Applicants who have completed Advanced Placement (AP) examinations or International Baccalaureate (IB) examinations or General Certificate of Education (Advanced Level) courses may be granted up to a maximum of 18 credit hours toward their UOIT degree. Other university-level courses taken while in high school/ secondary school will be considered on a case-by-case basis. Official documents must be supplied directly from the issuing institution to the Registrar's office to ensure granting of credit. Minimum subject scores of 4 in the Advanced Placement examinations and 5 in the International Baccalaureate examinations and grade of C or better in Advanced Level (A Level) courses are required for advance standing; minimum subject scores may vary by subject.

Credit and exemption will not be given for completion of high school Advanced Placement or International Baccalaureate or Advanced Level (A Level) courses unless an acceptable score is attained on the examination administered by the appropriate board.

4.6.2 Students transferring from other post-secondary institutions

Credits from other post-secondary institutions within and outside Canada will be evaluated on an individual basis following acceptance of an offer. Credit is subject to the university's residency requirement (Section 5.17) and to faculty-specific regulations. Transfer credits will be indicated by a T on the student's transcript and will not be used in the GPA calculation.

4.6.3 Challenge for credit

Faculties may offer examinations that allow students to demonstrate their competence in a subject for the purpose of advance standing. Please consult the appropriate dean's office. The fee for such examinations is 50 per cent of the applicable course fee. Unsuccessful attempts are counted as failures on the transcript.

4.7 English language proficiency

All applicants are required to give evidence of their oral and written proficiency in English. This requirement can be satisfied with one of the following criteria:

1. Your mother tongue or first language is English.
2. You have studied full-time for at least three years (or equivalent in part-time studies) or at least six semesters (studying no less than three courses per semester) in a secondary school or university where the language of instruction and examination was English. If this applies to you, please provide verification from your school that the language of instruction and examination was English. Please note: The minimum three-year requirement does not include time enrolled in ESL courses.
3. You have achieved the required proficiency on one of the tests in English language acceptable to UOIT.

Recommended scores – English language proficiency tests
Higher scores may be required and minimum overall scores may vary by program. For more detailed information, visit **www.uoit.ca**.

TOEFL (iBT)	83-87* (Listening 20, Reading 20, Speaking 19, Writing 20) *may vary by program
TOEFL (paper based)	560
IELTS	7
MELAB	85
CAEL	70 (with no sub-score below 60)

Students must arrange for original test scores to be sent directly from the testing centre to the Registrar's office.

UOIT's TOEFL Code is: 7178

Applicants who meet all the admission requirements for UOIT, with the exception of the English language proficiency requirement, must enrol in the English for Academic Purposes (EAP) program or provide a subsequent acceptable English proficiency test result. The EAP program is an English preparatory program for university-level studies and is offered through CultureWorks, UOIT's language proficiency partner. Upon successful completion of level 4, students will be eligible to proceed into a university degree program at UOIT. More information on UOIT's English language proficiency requirements and the EAP program offered by CultureWorks may be obtained by visiting **www.culture-works.com/uoit**.

4.8 Conditional admission

If an applicant is currently completing courses at a secondary or post-secondary institution, a conditional admission decision will be made. This decision will be based upon the applicant's eligibility for admission subject to successful completion of the courses for which he/she is currently registered. This decision will remain conditional until final results for the applicant's current program of study are available. All courses must be complete prior to beginning classes at UOIT.

The university may, in other circumstances, grant conditional acceptance to a student who is eligible for admission subject to satisfying specified conditions. These conditions will be outlined in the conditional offer of admission.

4.9 Deferral of application and offers

Applicants who are offered admission may apply to defer their application or their offer of admission by one year. Where an application is deferred, the applicant will not have to re-apply but will be reassessed for admissibility on a competitive basis in the relevant admission period. Where an offer is deferred, the applicant may register in a subsequent session within the one-year period without re-application.

A request for deferral of application or deferral of offer must be made in writing and submitted to the Registrar's office before the end of the regular registration period for the specific application term.

4.10 Applicants with disabilities

Applicants with disabilities who have received disability-related accommodations in high school or during a previous degree or diploma program are expected to have grades that accurately reflect their academic ability. Applicants who were not accommodated for all or part of their high school or degree or diploma program, or who believe that there are extenuating circumstances related to their disability that have negatively impacted on their grades may be eligible for consideration on the basis of their disability. For information, please visit **www.uoit.ca** or contact the Admissions office.

4.11 Program changes

Students wishing to pursue a program of study other than the one to which they were originally admitted must submit a change of program form to the Registrar's office. Such requests will be subject to the admission requirements of the new program of study and final approval rests with the dean of the faculty. Changes will be permitted only if space is available and all academic requirements are met. Program change requests must be submitted to the Registrar's office by the deadline specified at **www.uoit.ca**.

4.12 Honesty in applications

Students must declare fully their educational history when applying to the university.

Students must also advise the Registrar's office should they attend another post-secondary institution while a student at UOIT. Failure to declare previous or concurrent post-secondary education, or the falsification of any documents related to such academic pursuits, may result in suspension or expulsion from the university, including possible revocation of degrees awarded.

4.13 Appeal of admission decisions

Individuals may appeal their admission decision in writing within 10 days to the Registrar's office. There is a charge for such appeals, which is refundable if the appeal is successful. Admission appeals are referred to the Admissions and Scholarship Committee of Academic Council.

SECTION 5:
GENERAL ACADEMIC REGULATIONS

5.1 Selecting courses

Requirements for programs of study are listed in the faculty sections of this calendar. Students should become familiar with the program requirements and plan their programs accordingly. Academic advice is available to those who experience difficulty when selecting courses. Not all courses are offered in any one term or academic year. Elective offerings may vary from semester to semester.

5.2 Course changes and voluntary withdrawal

Students may add courses within the first two weeks of each semester. Students may withdraw from any or all courses within four weeks of the start of semester without academic consequences. Between four weeks and 48 teaching days (approximately 75 per cent through a semester), a W will be placed on the student's record indicating withdrawal. The W will not affect the grade point average (GPA). However, a large number of W grades may affect the way a transcript is viewed by graduate schools or potential employers. Courses may not be dropped after the 48th day. Withdrawal deadlines are not the same as the refund deadlines. Students should consult the academic schedule (Section 2) in this calendar when considering withdrawal.

Withdrawal from a course can have implications for a student's academic program or full-time status. A dropped course does not count toward degree requirements and cannot be used to satisfy prerequisites for further courses. In addition, the course that is dropped may not be available in the next semester or session. Students are advised to consider all course changes carefully or consult an advisor.

Students are reminded that non-attendance in a course is not equivalent to withdrawal.

Students who cease to attend a course but do not formally withdraw will be academically and financially responsible for that course.

5.3 Auditing courses

Students may audit a course provided they obtain the permission of the course instructor(s). They are not permitted to write examinations or receive any form of evaluation. They must register formally as auditors with the Registrar's office and pay the full course fee. However, audited courses will not appear on a student's transcript.

5.4 Letters of permission

Students wishing to take a course at another institution must in advance apply for and receive a Letter of Permission from UOIT. A letter of permission ensures that the courses to be taken at the host institution will be recognized for credit at UOIT and are applicable to the student's program of study.

The following eligibility requirements must be satisfied:

- Clear academic standing in core program courses;
- A minimum number of successfully completed UOIT credit hours may be required prior to request; and
- Must have the necessary UOIT prerequisite course(s).

In addition to meeting the eligibility requirements stated above the following restrictions apply:

- A maximum of 30 faculty-approved credit hours may be completed by letter of permission;
- Challenge for credit courses will not be considered;
- The host institution must offer university-level courses and be accredited by a recognized governing body;
- Combination of transfer credit(s) and letter(s) of permission cannot exceed residency requirement, see Section 5.17; and
- It is not recommended for a student to take a course on letter of permission in their final semester as it may affect graduation eligibility.

Students must complete the letter of permission request form and submit institutionally-prepared course syllabi to the Registrar's office. Students are responsible for having official transcripts sent from the host institution directly to the UOIT Registrar's office immediately following the completion of the course. The minimum mark a student must achieve to have the course transferred is 60 per cent. The letter of permission credit(s) will be indicated by a T on the student's transcript and will not be used in the GPA calculation. Failure to submit a final transcript or proof of withdrawal may result in an F grade recorded on the student's academic transcript and will be reflected in the GPA calculation. A minimum four-week processing time is required following the submission of complete documentation and payment of a non-refundable processing fee. UOIT students must be approved for a letter of permission before taking a course elsewhere. Failure to do so will result in the credit not being transferred. The letter of permission is granted on the approval of the dean in consultation with the Registrar's office.

5.5 Repeating courses

Students will be allowed to repeat courses in which they have received a grade of D or lower. Students will need to make arrangements with the Registrar's office to repeat a course. All instances of a course will appear on the academic transcript. The highest grade will be taken into account in the grade point average.

5.6 Prerequisites/corequisites

Some courses have prerequisites or corequisites. Where a prerequisite is specified, the prerequisite must be taken prior to the course in question. Where a corequisite is specified, the corequisite must be taken at the same time or prior to the course in question. Prerequisites and corequisites may be waived with the permission of the faculty. Any student who requests such a waiver is responsible to ensure that he/she is adequately prepared to proceed with the level of study required in the course. Inadequate preparation is not a basis for appeal of a final grade in a course for which a student requested a waiver of prerequisite or corequisite.

5.7 Full-time/part-time status

Each program has associated with it a number of credit hours that constitute a full course load. In many programs, this number is 15 per semester or 30 per academic year. Students are considered full-time when they take 60 per cent or more of the full course load. For example, a student in a program with a full course load of 15 credit hours per semester will be considered full-time if they are taking 9 credit hours or more. Full-time status may have an impact on such things as student aid and awards eligibility, fees, income tax credits, athletic eligibility and other areas.

5.8 Grading

Final grades for all courses will be submitted to the Registrar's office on a letter grade scale. Credit will be granted only for those courses completed with a grade of D or better. Faculties may require higher grades in some courses to meet degree requirements. See the faculty sections of this calendar for more information. The following descriptions outline the quality of work associated with each letter grade. Percentage-to-grade equivalencies are included as a guideline for conversion.

A failing grade of WF may be assigned if a student is administratively withdrawn for non-attendance.

Courses designated for pass/fail grading will be assigned a grade of PAS or FAL. For such courses, only failing grades will be included in the calculation of the grade point average.

If a student's grade is not available when final grades are approved at the end of a term, special designation will be temporarily added to his/her record. If a deferred examination has been granted, a grade of DEF will be assigned. If a portion of the work required for the course is incomplete, a grade of INC may be recorded. These grades may satisfy prerequisites for further courses on a temporary basis, but not beyond the end of the subsequent term after which these grades revert to F.

Grade	Percentage	Grade Points	Description
A+	90-100	4.3	**Excellent.** Strong evidence of originality and independence of thought; good organization; capacity to analyze and synthesize; superior grasp of subject matter with sound critical evaluations; evidence of extensive knowledge base; an outstanding ability to communicate.
A	85-89	4	
A-	80-84	3.7	
B+	77-79	3.3	**Good.** Substantial knowledge of subject matter; some evidence of organization and analytic ability; a moderate degree of originality and independence of thought; reasonable understanding of relevant issues; evidence of familiarity with literature; an ability to communicate clearly and fluently.
B	73-76	3	
B-	70-72	2.7	
C+	67-69	2.3	**Adequate.** Student is profiting from his/her university experience; an acceptable understanding of the subject matter; ability to develop solutions to simple problems in the material; some ability to organize and analyze ideas; an ability to communicate adequately.
C	60-66	2	
D	50-59	1	**Marginal.** Some evidence that critical and analytic skills have been developed; rudimentary knowledge of the subject matter; significant weakness in the ability to communicate.
F	0-49	0	**Inadequate.** Little evidence of even superficial understanding of subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature; failure to complete required work; an inability to communicate.

5.9 Academic standing

Academic standing is calculated and recorded on academic transcripts at the end of each semester for every full-time student. Academic standing regulations are applied to part-time students after completion of 9 credit hours.

Academic standing is determined by the semester and cumulative grade point averages and the student's academic standing in the previous semester. The minimum cumulative grade point average required for graduation is 2.00.

Clear standing	Students are required to maintain a minimum cumulative grade point average of 2.00 to remain in clear standing.
Academic warning	Students in clear standing and first semester students whose cumulative grade point average falls between 1.50 and 1.99 will receive a letter of warning and will be encouraged to contact an academic advisor.
Probation	Students will be placed on probation if their cumulative grade point average falls between 1.00 and 1.49 or if they receive a second consecutive warning. Students on probation will be required to contact an academic advisor. The academic advisor will approve the student's schedule for the following semester with a view of raising the cumulative GPA to 2.00 within two semesters. Students failing to consult an advisor or failing to register for the approved schedule will be deregistered. Students on probation may continue their studies as long as they continue to achieve a semester grade point average of 2.00. Students placed on probation remain on probation until their cumulative grade point average is 2.00 or higher.
Suspension	Students will be suspended if their cumulative grade point average falls below 1.00 or if they fail to fulfil the conditions of probation. Following a period of at least two semesters, a suspended student may apply for readmission to the university through the Registrar's office. This application will be considered at the discretion of the dean of the faculty to which the application is made. The student may be asked to agree to conditions for reinstatement.
Dismissal	Students readmitted after a period of suspension will be readmitted on probation. Students who fail to comply with the conditions of reinstatement or whose performance would result in suspension for a second time will be dismissed. Students who exceed the prescribed time limit for completion of a degree program will not be permitted to continue in that program, and hence will be dismissed. See Section 4.5.10 for more information regarding reinstatement of a UOIT student following dismissal.

Students may appeal their academic standing if their academic performance was affected by significantly extenuating circumstances beyond their control. Appeals of academic standing must be submitted in writing to the dean of the faculty in which the student is enrolled within 10 working days of the notification of the student's academic standing. A complete statement of all the grounds on which the appeal is based, including supporting documentation, must be specified in the appeal. If the appeal is successful, the student's academic standing will be adjusted appropriately and the student may be required to undertake a specified program of study. It is expected that the student will be informed of the decision in writing within 10 working days of the filing of the appeal.

5.10 Grade changes

After grades have been officially approved and released, any grade changes must be submitted in writing to the registrar. Grade changes may result from the submission of course work, the writing of a deferred examination, clerical errors, or an approved examination re-read. All grade changes must be approved by the course instructor and the dean or designate.

5.11 Grade reappraisals and appeals

Matters concerning term work normally fall within the authority of the instructor. If a student has a concern regarding course work, the student should make an appointment, as soon as possible, with the instructor so that any issues can be resolved quickly and informally. Students unable to comply with given deadlines must contact their instructor prior to the deadline if an extension to the deadline is requested. All term work must be submitted by the last day of classes, unless an earlier date has been specified. Instructors may grant extensions beyond their own deadlines or beyond the last day of classes up to the last day of the examination period provided that a student presents reasons of illness, etc., with appropriate documentation. Extensions beyond the last day of the examination period can only be granted by academic appeal.

5.11.1 Requesting a grade reappraisal

In the event that a student wishes a grade on a piece of tangible work to be reappraised, he or she should, in the first instance, bring the disputed piece of work directly to the course instructor to seek informal resolution. If this course of action does not satisfy the student, he or she may seek a final grade appeal.

5.11.2 Final grade appeals

Students may, with sufficient academic grounds, request that a final grade in a course be appealed (which will comprise only the review of specific pieces of tangible but not oral work). Grounds not related to academic merit are not relevant for grade appeals. In such cases, students are advised to follow the procedures set out under Section 5.11.3.

Students are normally expected to contact the course director first to discuss the grade received and to request that their tangible work be reviewed. Students should be aware that a request for a grade appeal may result in the original grade being raised, lowered or confirmed. The deadline for submitting grade appeals is three weeks after the release of final grade reports in any term.

If the condition of sufficient academic grounds has been met, the student shall lodge a request with the Registrar's office, who will contact the relevant dean and collect fees incurred for the appeal. Students must specify the rationale for their appeal by making clear the component of the final grade upon which they seek appeal. The dean will be responsible for ensuring that the work is reappraised by an appropriate faculty member, ensuring anonymity of both the student and the reappraiser, and for communicating the result of the appeal (including the reappraiser's comments) and the route of appeal to both the student and the course director. The reappraiser will be given the nature of the assignment and the rationale for the original grade. It is expected that every effort will be made to render the decision within 30 days of the reviewer having received the work.

In the event that a student is still not satisfied with the final grade or the course director is not available to review the work, a student may submit, in writing, a formal request for a grade appeal to the Academic Appeals Committee. Such appeals can only be considered on the grounds of procedural irregularity. Appeals must be submitted within 15 working days of notification of the decision. At the discretion of the committee, the student and/or the faculty member may be invited to meet with the committee to present their case(s) orally. The committee's decision will be taken in camera and it is expected that parties will be informed of the decision in writing within 20 working days of the filing of the appeal.

5.11.3 Other academic appeals

Students are normally expected to contact the course director first to discuss an academic complaint. If the concern is not resolved, the student may subsequently approach the dean. All formal decisions of deans may be appealed to the Academic Appeals Committee. The student and instructor will both be given 10 working days to gather new evidence, if required, and to submit a letter of appeal to the Academic Appeals Committee. Under normal circumstances, a final grade will not be reported before an appeal is decided, nor will official transcripts be issued.

Appeals must contain:

- The specific faculty decision which is being appealed;
- The form of redress requested;
- The specific grounds on which the appeal is made;
- A summary of the evidence in support of these grounds;
- The text of the faculty decision being appealed; and
- The text of the relevant procedural regulations (if any) allegedly violated or otherwise deemed applicable to the case.

Appeals to the Academic Appeals Committee for waivers of academic regulations will be permitted only on the grounds of:

- New evidence, i.e., evidence relevant to the decision made at the faculty level, but through no fault of the appellant not presented at that level. Generally speaking, events or performance subsequent to the faculty decision are not to be construed as new evidence; or
- Evidence of procedural irregularity in the faculty's consideration of the case.

5.12 Dean's Honours List and the President's List

Students in clear standing with a semester GPA of 3.5 to 3.79 on at least 80 per cent of a full course load at the end of a semester will receive the designation Dean's Honours List on their transcripts. Students in clear standing with a semester GPA of 3.8 or higher on at least 80 per cent of a full course load will receive the designation President's List on their transcripts.

5.13 Documents and student files

Documents submitted to the Registrar's office become the property of the university and are protected under provincial privacy legislation. Original copies of documents are kept on file at the Registrar's office and may not be returned to the student.

Official student academic records deemed to have archival value and preserved in the university archives shall be made available to researchers authorized by the university 75 years after the student ceased to be registered.

5.14 Curriculum substitution

Students wishing to substitute one course for another in a set of program requirements may request permission to do so from the dean of the faculty or designate. Requests are referred to the appropriate Faculty Council for decision.

5.15 Academic conduct

Faculty members and students share an important responsibility to maintain the integrity of the teaching and learning relationship. This relationship is characterized by honesty, fairness and mutual respect for the aims and principles of the pursuit of education. Academic misconduct impedes the activities of the university community and is punishable by appropriate disciplinary action.

The university and its members have the responsibility of providing an environment that does not facilitate the inadvertent commission of academic misconduct. Students and faculty should be made aware of the actions that constitute academic misconduct, the procedures for launching and resolving complaints, and the penalties for commission of acts of misconduct. A lack of familiarity with the university's policy on academic conduct on the part of a student does not constitute a defence against its application.

5.15.1 Academic misconduct

Academic misconduct includes, but is not limited to:

1. Unreasonable infringement on the freedom of other members of the academic community (e.g., disrupting classes or examinations, harassing, intimidating, or threatening others).
2. Violation of safety regulations in a laboratory or other setting.
3. Cheating on examinations, assignments, reports, or other work used to evaluate student performance. Cheating includes, among other things, copying from another student's work or allowing one's own work to be copied, submitting another person's work as one's own, fabrication of data, consultation with an unauthorized person during an examination, use of unauthorized aids, or submitting work prepared in collaboration with other member(s) of a class, when collaborative work on a project has not been authorized by the instructor.
4. Impersonating another student or allowing oneself to be impersonated for purposes of taking examinations, or carrying out laboratory or other assignments.
5. Plagiarism, which is the act of presenting the ideas, words, or other intellectual property of another as one's own, including images, designs, processes, computer software, digital, audio and video files, Internet resources and other works without appropriate attribution or credit. The use of other people's work must be properly acknowledged and referenced in all written material.
6. Obtaining by improper means examination papers, tests, or similar materials; use or distribution of such materials to others.
7. Falsifying academic records, including tests and examinations, or submitting false credentials for purpose of gaining admission to a program or course, or for any other purpose.
8. Misrepresentation of facts, whether written or oral, which may have an effect on academic evaluation. This includes making fraudulent health claims, obtaining medical or other certificates under false pretences, or altering certificates for the purpose of misrepresentation.
9. Submission of work when a major portion has been previously submitted or is being submitted for another course, without the express permission of all instructors involved.

5.15.2 Professional unsuitability

Students in programs leading to professional certification must demonstrate behaviour appropriate to practice in those professions. Where a dean determines that behaviour inconsistent with the norms and expectations of the profession has been exhibited by a student, that student may be immediately withdrawn from the program by the dean or subject to one or more of the sanctions described below.

A student demonstrating professional unsuitability may be immediately suspended from any practicum, field work or similar activity at the discretion of the dean pending a final decision.

5.15.3 Sanctions

If a student is deemed to have committed academic misconduct or that they are alleged to have demonstrated behaviour inconsistent with professional suitability, one or more of the following disciplinary sanctions may be imposed. The severity of the sanction will be determined by the nature of the offence and the student's past record of conduct. Students found guilty of successive acts of misconduct will receive increasingly severe sanctions, not limited to the following:

1. Resubmission of the piece of academic work in respect of which the misconduct was committed, for evaluation.
2. A written reprimand, warning the student that the behaviour was unacceptable and that further misconduct will lead to additional sanctions. A copy of the reprimand will be placed in the student's file, but no notation will appear on the academic record.
3. Submission of a failing grade in an examination, test, assignment or course.
4. Disciplinary probation for the remainder of the student's registration in his/her current program of study. A note to this effect will be placed in the student's file, and a notation may appear on his/her academic record. Any further offence will lead to a more severe sanction.
5. Expunging of grades or revoking of degrees.

6. Restraining orders or monetary restitution where appropriate in the case of threats, harassment, or damage to property.
7. Suspension from attendance in a course, a program, a faculty, or the university, for a period not less than one term (fall or winter) and not exceeding three years as deemed appropriate. While suspended, a student may not register, and loses the right to attend lectures, write examinations, and receive payment from university sources. Courses taken elsewhere during the period of suspension are not eligible for transfer credit. Notice of suspension will be placed in the student's file and will appear on his/her academic record. The conditions of suspension will specify the length of time such notice will remain on the student's academic record.
8. Permanent expulsion from the university. A note to this effect will be placed in the student's file and will remain on his/her academic record.
9. Such other sanctions as deemed appropriate.

5.15.4 Launching and resolving complaints

With respect to all accusations of academic misconduct or professional unsuitability, students are presumed innocent until the contrary has been established. Decisions regarding the commission of academic misconduct or professional unsuitability are based on the balance of probabilities. A record of all allegations of misconduct, along with details of the resolution, will be entered into the central academic records kept by the Registrar's office.

Faculty, staff, or students who have reason to believe that an academic offence has been committed should report the matter promptly to the dean of the faculty responsible for the course in which the offence was committed. Alleged non-course related offences should be reported to the dean of the faculty in which the student is enrolled.

5.15.5 Complaints resolved by the course instructor

In the following circumstances, the course instructor may choose to deal with allegations of academic misconduct:

- The offence relates to a piece of academic work representing 25 per cent or less of the final grade in the course;
- The student has committed no other academic offence before;
- The student admits to having committed the offence; and
- The student consents to the sanction proposed by the course instructor.

In such circumstances, the sanction proposed by the course instructor will consist of resubmission of a piece of academic work, a written reprimand, or submission of a failing grade for the piece of work. The course instructor may also choose to deal with these cases personally or to refer them to the course dean for action. The student may also elect to have the matter referred to the course dean. Before acting, the course instructor must check with the Registrar's office to see whether any record of any previous academic offence(s) had been deposited in the student's file. For a first lesser academic offence, the course instructor is responsible for notifying the student of the offence and securing the student's written acknowledgement that they had committed the offence, that they agree to the sanction, and that they agree that no appeal may be taken from this sanction. Upon notification, the student will have five working days in which to respond to the allegation. The course instructor shall notify the Registrar's office of the offence. This material will be placed in the student's file for future reference but no notation will appear on the academic record. Lesser academic offences resolved by agreement between the course instructor and the student may not be appealed.

If no response is received within the time period, the instructor will refer the matter to the course dean for formal resolution.

5.15.6 Complaints resolved by the dean

If a complaint of academic misconduct cannot be resolved by a course instructor, or if the course instructor or the student refers the complaint to the course dean, the dean shall be responsible for addressing the complaint. All allegations of professional unsuitability must be addressed by the home dean.

The dean shall establish an academic integrity committee comprised of the dean's delegate and two members of the academic staff to investigate the complaint and recommend a resolution. A student will not be permitted to withdraw from the course in which the offence was alleged to have been committed until the matter is resolved and sanction imposed. In cases where the resolution may result in the expunging of grades, the revoking of degrees, or in the student being suspended or expelled, the deans of both the faculty responsible for the course in which the offence was committed and the faculty in which the student is enrolled must consult and agree on the sanctions coming from the offence. If the deans cannot agree on the sanctions, the final resolution will rest with the associate provost, academic.

5.15.7 Procedures for formal resolution

The dean/delegate must inform the student, in writing, of the allegations, the possible sanctions and a copy of the pertinent policy statement. The student will be given five working days to prepare a response. The academic integrity committee will then meet with the student to hear the response. The student is entitled to be accompanied by up to two advisors at this meeting, provided 48 hours advanced notice is given of the identity of the advisors.

The committee shall then conduct a thorough investigation of the allegations and response, and make its recommendation to the dean within 10 further working days. The dean will notify the parties of the decision in writing. A copy of the decision will be provided on a need-to-know basis to administrative units (e.g., other faculties, the registrar).

5.15.8 Transcript notations and appeal process

Transcript notations for academic misconduct will include the following range of notations: grade of F assigned for [course number] for academic misconduct; suspended for academic misconduct for [dates of suspension]; suspended for professional unsuitability; and permanently expelled for academic misconduct. Transcript notations will normally be recorded on the academic transcript for a minimum of two years.

A student may apply to the Academic Appeals Committee to have the notice of suspension and/or transcript notation expunged from his/her academic record after a minimum of two years from the last offence. If the appeal is granted, the Registrar’s office will be notified to remove the notation.

Transcript notations for students who are suspended for professional unsuitability or permanently expelled for academic misconduct will remain on their academic record and cannot be appealed.

5.15.9 Appeals

Formal decisions of deans relating to academic misconduct or professional unsuitability may be appealed. The student will be given 10 working days to gather new evidence and to submit a letter of appeal to the academic appeals committee. Under normal circumstances, disciplinary penalties will not be imposed before an appeal is decided, nor will official transcripts be issued. Formal registration may be revoked. A student may apply to the dean for continued attendance in classes and related activities while the appeal is being heard. In order for such a request to be granted, the dean must be satisfied that there would be no detrimental effect of such continued attendance. If the appeal is granted, formal registration will be reinstated or the matter remitted back to the dean or provost for reconsideration as appropriate.

5.16 Academic accommodation for students with disabilities

Students with disabilities may request to be considered for formal academic accommodation in accordance with the Ontario Human Rights Code. Students seeking accommodation must make their requests through the Centre for Students with Disabilities at the north Oshawa location or the Student Experience Centre – Disability Services at the downtown Oshawa location. Requests must be made in a timely manner, and students must provide relevant and recent documentation to verify the effect of their disability and to allow the university to determine appropriate accommodations.

Accommodation decisions will be made in accordance with the Ontario Human Rights Code. Accommodations will be consistent with and supportive of the essential requirements of courses and programs, and provided in a way that respects the dignity of students with disabilities and encourages integration and equality of opportunity. Reasonable academic accommodation may require instructors to exercise creativity and flexibility in responding to the needs of students with disabilities while maintaining academic integrity.

5.17 Residency requirements

At least half of a student’s courses must be from among UOIT course offerings in order to meet the residency requirements for graduation. In exceptional circumstances, with sufficient advance notice, or in the case of special agreements with other universities, a dean may reduce this requirement to 25 per cent. Such cases are reported to Academic Council for information.

5.18 Conferral of degrees

Degrees will be deemed conferred at the time of Academic Council approval, and notation of the degrees awarded will be entered on the students' records. All students who are awarded a degree are eligible to attend the session of convocation that immediately follows the date of conferral.

5.19 Graduation with distinction

At the time of graduation, students who have achieved a cumulative GPA of 3.50 to 3.79 on the courses required for the degree will have the words "with distinction" added to the degree parchment and to the degree notation on the transcript. Students who achieve a cumulative GPA of 3.80 or higher on the courses required for the degree will have the words "with highest distinction" added to the degree parchment and to the degree notation on the transcript.

5.20 Graduation notwithstanding a deficiency

In exceptional circumstances, a dean may recommend to Academic Council that a student receive a degree or other qualification notwithstanding the fact that the student has not completed all normal academic requirements. Deans will advise the registrar of such candidates for graduation, and the registrar will bring forward the following motion to Academic Council: "That the following student(s) be approved for graduation notwithstanding a deficiency in their academic history." The program completed and reasons for the recommendation will be provided; personal identifying information will be excluded.

5.21 Dual degrees

Students in clear standing after one year of academic studies may apply to the Registrar's office to complete two degrees simultaneously.

5.22 Time limits

Generally, students must complete a degree program within a number of years equal to twice the length of time it would take to complete the program on a full load basis. Students taking the one year Bachelor of Education program must complete the program within three years. Students unable to complete the degree within the time limit must apply for an extension of the degree program to ensure continued eligibility to graduate. Applications for extension will be considered at the discretion of the dean and will normally be granted only in exceptional circumstances.

5.23 Second degrees

Students holding a UOIT degree may pursue a second degree in another area. In addition to meeting all requirements of that degree, at least one additional year of study is required to qualify.

5.24 Final examination policy

This policy provides guidelines for the scheduling and administration of final examinations, as well as the submission, approval, and release of final grades.

Definitions

Final examination – Final examinations as referenced in this document should be interpreted in the ordinary sense of the word; usually covering all, or a very substantial portion of, the material dealt with in one academic term.

Non-comprehensive final examination – An examination held after the end of lectures, covering only the last unit of work completed in a course. These examinations are not administered by the Registrar's office, but they are subject to the rules of scheduling, proctoring, grade submission, and other miscellaneous regulations set out in sections 1, 3, 4 and 5 of this section.

The purpose of the final examination policy is:

- To enable university faculty and staff to meet their responsibilities regarding the preparation and administration of a final examination through a common final examination schedule;
- To facilitate the timely submission, approval, and release of final grades;
- To outline appropriate cases for deferred, supplementary, and reread of examinations; and
- To provide procedures for dealing with violation of examination protocol and emergency situations.

Students must present their current student ID card at each examination. If a student fails to produce their student ID card, they will be required to immediately obtain a substitute card from the Campus ID Services; no extension of the examination will be permitted to compensate for the delay encountered.

5.24.1 Scheduling

5.24.1.1 Study break

No final examinations, tests, or lectures may be administered in the period after the last day of lectures and before the start of the final examination period. In addition, students may not be required to submit term papers, reports, or other assigned materials during this period.

5.24.1.2 Generating the schedule

When submitting the list of course offerings each term, academic units will indicate to the Registrar's office whether a final exam is to be administered in each course section. All final examinations will be scheduled after the last day to add courses in a given term. Scheduling will be conducted in such a way as to optimize the time between each examination for each student. Courses with multiple sections writing a common examination will be given priority in scheduling to ensure availability of space and to allow instructors sufficient time to grade all papers prior to the deadline for grade submission.

The final examination timetable will be published no later than six weeks prior to the first day of the final examination period.

5.24.1.3 Examination time slots

The final examination period will consist of 10 days. Four examination periods per day, Monday through Saturday, will be provided: 8 to 11 a.m., noon to 3 p.m., 3:30 to 6:30 p.m., and 7 to 10 p.m.

Courses in which lectures are held during the evening will normally be scheduled for examination in the evening.

5.24.1.4 Religious observances

Students who are unable to write a final examination when scheduled due to religious obligations may make arrangements to write a deferred examination. These students are required to submit an Application for Deferred Final Examinations for Religious Observances to the faculty office concerned as soon as possible and no later than three weeks prior to the first day of the final examination period.

Every effort must be made to accommodate those students who, through religious obligations, are unable to write examinations at the time scheduled.

5.24.1.5 Deferral

A student who has missed a final examination because of an incapacitating illness, severe family emergency or other compelling reason may apply for a deferred examination. A student needing to apply for a deferred examination must submit an Application for Deferred Final Examination to the Faculty office, along with supporting documentation, within five working days after the scheduled writing of the examination. Where the cause is incapacitating illness, the student must present a UOIT Medical Statement completed and signed by the treating physician and normally dated no later than 24 hours after the scheduled examination. In other cases, adequate documentation must be provided to substantiate the reason for the absence. Faculties will only grant deferred examinations where sufficient documentation exists.

Faculties may also grant a deferred examination to a student who is scheduled to write and complete three examinations within a 24 hour period. In this case, the exam in the middle of the three is the one that will be considered for deferral. Scheduling is conducted in such a way as to minimize the instance of consecutive examinations for students.

If a technical difficulty prevents the writing of a computer-based examination, the faculty may arrange for a deferred examination for all students in the class.

All deferred examinations will be scheduled no later than the end of the first week of classes in the following semester.

If a student who is granted an examination deferral does not write the exam by the scheduled deferred examination date, normally a grade of zero will be recorded for the final examination.

5.24.1.6 Time conflicts

In the event that a student is unavoidably scheduled to write two examinations at the same time and is not eligible for deferral, provision should be made with the Registrar's office to write both examinations consecutively in a secure location.

5.24.2 Administration

5.24.2.1 Copying and distribution

When submitting original course offering information, academic units will indicate for each course section whether an examination is to be administered by the Registrar's office, or by the academic unit itself. The Registrar's office will be responsible for the copying and distribution of final examinations in any course section in which the faculty has elected final examination administration by the Registrar's office.

Faculties that opted for administration by the Registrar's office must deliver final exam master copies to the Registrar's office no later than 10 working days prior to the start of the final examination period. A standard cover page is available from the Registrar's office and should be attached to the master copy of the question paper. This cover page will include all pertinent information including the course name, number, and section, the number of pages in the examination paper, and the materials permitted to be used during the examination. The Registrar's office will assume no responsibility for the printing of examination papers not submitted by the above-noted deadline.

If the final examination is to be administered online, at least 15 per cent of the examinations should be available in paper format in case of technical difficulties.

The cost of reprinting examination papers to correct errors and/or omissions will be the responsibility of the faculty concerned.

5.24.2.2 Alternative exam accommodations for students with disabilities

The Centre for Students with Disabilities (north Oshawa location) and the Student Experience Centre – Disability Services (downtown Oshawa location) work with faculty members to provide alternative exam accommodations for students with disabilities. Common alternative accommodations include extended exam time, oral evaluation, scribing, test clarification, private location, alternative exam format, or adaptive technologies. Students must work with faculty members and Disability Services staff at the appropriate location to identify their specific needs well in advance of the scheduled exam time and be aware of the exam registration deadlines.*

Faculty will be advised in writing of those students who have been approved for exam accommodations. Final examinations for these students must be submitted by the faculty to their faculty office three working days prior to the scheduled date of the final exam. The faculty office will subsequently forward the exams to the appropriate Disability Services office. Faculty can obtain completed exams from the Disability Services office the following day.

*Students studying at the north Oshawa location will work with the Centre for Students with Disabilities; students studying with the Faculty of Social Science and Humanities or the Faculty of Education will work with Student Experience Centre - Disability Services.

5.24.3 Proctoring

5.24.3.1 Assigning proctors

The faculty will assign individuals to proctor and preside at the examination. Course instructors should normally proctor their own final examinations. If this is not possible, the faculty should assign an alternate who has adequate knowledge of the subject matter being tested.

There should be at least one proctor assigned for every 50 students or part thereof, and at least one male and one female proctor should be present at all times.

5.24.3.2 Time

Course instructors and proctors must arrive at the examination room at least 30 minutes prior to the start of the examination. Students will be permitted to enter the examination room 20 minutes prior to the start of the examination.

For examinations scheduled in a gymnasium, instructors and proctors must arrive at least one hour prior to the start of the examination. Students will be permitted to enter the gymnasium 20 minutes prior to the start of the examination.

If the start of the examination is delayed, the examination will proceed with additional time allowed to compensate for the late start. Students will not be permitted to leave the examination room for the first hour of examinations that are three hours in duration. Students will not be permitted into the examination room after the first hour of an examination. Students arriving after the start of the examination will be permitted to write the exam, but no additional time beyond that given to all students will be granted.

A student may, with the permission of the course instructor or proctor, leave the examination room briefly only if accompanied by a proctor.

No student will be permitted to hand in a paper and leave the examination room within the last 15 minutes of the examination time. All students will remain seated and no student will be permitted to leave the room after this time until all papers have been collected.

5.24.3.3 Identification

Students must present their current student ID card at each examination. If a student fails to produce their student ID card, they will be required to immediately obtain a substitute card from the Campus ID Services; no extension of the examination will be permitted to compensate for any delay encountered. Students will also endorse each answer booklet before writing an examination.

5.24.3.4 Materials

Permissible materials should be communicated clearly to students prior to the last day of lectures for the term. This includes information regarding the use of textbooks, lecture notes, etc. Only those items authorized for use in the examination are to be brought into the examination room. If calculators or other instruments are allowed, instructors should exercise care in specifying the exact type of instrument permitted. Any jackets, hats, bags, knapsacks, etc., are to be left at the front or back of the examination room and may be picked up at the end of the examination. For reasons of security, students should be discouraged from bringing their laptops into the examination room if they are not required for their examination. If students do bring their laptops into the examination room, they should be directed to store them under their chairs. Any other electronic devices, unless explicitly permitted by the course instructor, are not permitted into the examination room.

The university is not responsible for lost or stolen items brought into examination rooms.

5.24.3.5 Violation of examination protocol

Where there are reasonable grounds to believe a violation of examination protocol has occurred, the course instructor or proctor has the authority to:

- Remove any materials or devices not authorized for use in the examination and keep such materials until the student has completed the examination;
- Search through personal belongings to remove evidence of the violation (this must be done in the presence of the student and another proctor);
- Ask the student to produce evidence of the violation where the course instructor or proctor believes that he/she has hidden it on his/her person – under no circumstances should the alleged offender be touched;
- Ask the student to move to a seat that is more easily monitored; and
- Remove answer books and replace them with new ones.

In all cases, a student should be permitted to finish writing the examination. At the conclusion of the examination, the course instructor or proctor must make a note of the time and details of the alleged offence, including any refusal to cooperate. The course instructor or proctor should explain to the student that the status of his/her examination is in question and set it aside. All evidence should be gathered and turned over to the course instructor. The course instructor and/or proctor must file a complaint of academic dishonesty.

5.24.3.6 Emergency procedures

In the event of an emergency, the course instructor or proctor shall follow the examination emergency procedures provided by the Registrar’s office. The course instructor has the authority to extend the examination time to compensate for time lost up to 30 minutes.

If an emergency requires students to leave the examination room, all examination materials will be considered void. All answer booklets will be destroyed without grading. The examination will be rescheduled within the first week of the following term and a new examination script will be prepared.

5.24.3.7 Disruption of examinations

Conduct around the disruption of an examination or conspiring to disrupt an examination shall be dealt with under the UOIT student conduct and disciplinary procedures in non-academic matters and/or criminal or civil proceedings as appropriate.

5.24.4 Grade submission

5.24.4.1 Deadlines

All final grades must be submitted to the Registrar's office within five days of the end of the final examination period.

5.24.4.2 Submission

Faculty members will have access via MyCampus to class lists for those courses for which they were the assigned instructor. All course grades must be entered in this manner.

The faculty will have access via MyCampus to class lists for those courses administered by his/her faculty. Once instructors have entered the grades, the dean will review the grades and/or grade distributions and approve them as entered. This approval will lock the grades so that no further changes can be made. The locking process will result in the submission of final grades to the Registrar's office.

5.24.4.3 Release of grades

Final grades will normally be released to students via MyCampus on the evening of the fifth day following the end of the final examination period.

5.24.4.4 Grade changes

After a final grade has been released, any changes must be made in writing to the Registrar's office. Changes must bear the signature of the course instructor and the dean of the faculty, and must indicate the reason for the change.

5.24.5 Miscellaneous

5.24.5.1 Student access to final examination scripts

Final examination scripts are the property of the university. However, a student has the right to view his/her final examination script and grade. The supervision of the viewing of the examination script is the responsibility of the faculty. A student who wishes to view a final examination script should submit a request in writing to the faculty in which the exam was administered. Unless a clerical error has occurred, an instructor may not make changes to the final grade awarded in a course as a result of such a viewing. If, after viewing the final examination script, the student wishes to dispute the final grade awarded, he/she should submit a grade appeal to the Registrar's office.

5.24.5.2 Supplementary examinations

Students requesting supplementary examinations will be asked to consult the faculty.

5.25 Other academic policies

This policy covers academic matters, including academic standing, other than merit-based grade appeals (see Section 5.11). If the concern is not resolved, the student may subsequently approach the dean.

Students are expected to refer to the following important documents:

- Information Technology Acceptable Use Policy; and
- Policy on Student Conduct and Disciplinary Procedures in Non-Academic Matters.

Students should also familiarize themselves with the following academic policies, which are available at **www.uoit.ca**:

- Course evaluations;
- Responsibilities of academic staff with regard to students;
- Technology and web-centric teaching and learning; and
- Use of turnitin.com's plagiarism detection system.

SECTION 6: FEES AND CHARGES

For information about specific, current fees, visit **www.uoit.ca**.

6.1 General information

After registration, each student will be able to view a detailed assessment of fees due, through the online registration process. No fee statements will be mailed. Students are responsible for paying amounts owing by the fee deadlines specified in the academic schedule.

Students with fees outstanding beyond the due date will be assessed a late payment fee and will be subject to the university's hold policy. Students on hold are unable to register, order transcripts, or graduate. Other services (e.g. library access, parking passes) may also be denied.

Students expecting to receive financial aid or awards after payment deadlines should make arrangements with the Accounting office. In all cases, outstanding fees must be paid before subsequent registration will be allowed.

A student dropping courses within the first 10 lecture days in any semester will not be liable for tuition fees for those courses. Any student who drops a course after the 10th day of lectures up to the 20th day of lectures will receive a 50 per cent refund of tuition fees. No tuition will be refunded for courses dropped after the 20th day of lectures. Students wishing to drop courses should consult the academic schedule in this calendar for specific refund dates.

6.2 Methods of payment and settlement

Please visit **http://uoit.ca/studentfinances** for full details and instructions on payment and settlement types.

6.2.1 Methods of payment

1. Internet/telephone banking – primary method
2. Money order, certified cheque, bank draft
3. Wire or bank transfer – for international students

6.2.2 Methods of settlement

The promissory note for deferment of fees allows a student to defer payment of their tuition fees past the fee deadline date.

Approved funding types for deferment of fees:

- OSAP
- Research assistantship
- Teaching assistantship
- Research grant
- External scholarship
- Third-party sponsorship

Please visit **http://uoit.ca/studentfinances** to download and print the promissory note for deferment of fees form and instructions to complete. The deferment form must be completed and submitted by the fee deadline date.

Please note: UOIT does NOT accept non-certified cheques, credit cards, debit card or cash for tuition and program-related fees. If you wish to remit payment via these methods, please contact your bank and remit your payment to us via Internet/telephone banking.

6.3 Tuition and fees

Tuition fees are charged on a per credit hour basis, up to the maximum annual program fee. Students who elect to complete additional courses beyond those required by the program will be charged for the additional courses at the regular per credit hour rate.

Tuition, ancillary, and student organization fees are assessed on a semester basis and are due the day before classes begin each semester. Any appeal of this assessment on exceptional medical or compassionate grounds must be made to the Registrar's office.

6.4 Ancillary and student organization fees

Ancillary and student organization fees are charged on a semester basis and are due the day before classes begin each semester. Ancillary fees include athletics, recreation, student services, student life, counselling, student handbook, and information technology infrastructure. Student organization fees include student government and the student centre capital fund.

Students who enrol in less than the full course load prescribed for their program will be charged ancillary and student organization fees on a pro-rated basis.

6.5 Health and dental insurance

Health and dental insurance fees are charged annually and are assessed as part of fall semester fees. These fees are charged to full-time students only. Students dropping to part-time status before the opt-out date will receive a refund of health and dental fees. International students are required to pay the University Health Insurance Plan (UHIP) fees in addition to regular health and dental insurance fees. The rates are determined by the insurer.

6.6 Mobile Learning program

All students are required to participate in the Mobile Learning program. The Mobile Learning fee must be paid prior to picking up the laptop.

6.7 Co-op and internship fees

Co-op and internship fees apply to those students in engineering, engineering and management, science or science and management who choose to participate in the optional Co-op or Internship program after their third year of study.

6.8 Residence and campus dining plan fees

6.8.1 Residence

Residence fees are charged for an eight-month period (September to April). For payment deadlines and details, please visit **www.uoitrez.ca**.

Simcoe Village:
The South and Central Halls of Simcoe Village offer open concept suites shared by two beds (traditional dorm rooms). The North Hall offers suites with two separate bedrooms.

South Village:
The South Village offers suites with two separate bedrooms. A dining plan is mandatory for all students living in the South Village residence.

6.8.2 Campus dining plans

Students living in the South Village must choose one of the compulsory dining plans.

All other students may choose to purchase one of the voluntary dining plans. Campus dining plans consist of a set number of meals per week and a credit account, which may be used to purchase food from on-campus eating facilities.

6.9 Parking

Parking rates are determined annually. Rates vary depending on the permit type. Visit **www.uoit.ca** for more information.

SECTION 7:
STUDENT AWARDS AND FINANCIAL AID

Financial planning is a vital element of being a successful student. There are many forms of financial aid available to students. For more information about the programs listed below, contact information, and office hours, visit **www.uoit.ca/safa**.

7.1 Ontario Student Assistance Program

The Ontario Student Assistance Program (OSAP) provides both loan and grant assistance to help students and their families finance their education. By completing an OSAP application, qualified students will be assessed for loans and grants offered by both the federal and provincial governments, including consideration for the Student Access Guarantee. Students may find information about the OSAP program and apply for OSAP online at **http://osap.gov.on.ca**.

7.2 On-campus work programs

The university provides many on-campus, part-time jobs, as well as full-time summer employment. Apply early if working part-time is part of your financial plan. The Ontario Work Study Program may provide on-campus, part-time employment to applicants demonstrating a financial need beyond their resources.

7.3 Bursaries

Students who are experiencing financial difficulties could face significant challenges which affect not only their academic progress but also their ability to remain in school. Full time post-secondary students can complete an online Student Financial Profile available on the MyCampus portal to be considered for financial assistance. Students, including those identified under the Student Access Guarantee guidelines, may be approved for several types of financial support through this application process.

Students who face unanticipated financial problems at any time in the year should contact the Student Awards and Financial Aid office. An appointment with a financial aid officer may be helpful in identifying possible solutions. Emergency appointments are available for students each day.

7.4 Emergency loans

Emergency loans are sometimes available to students awaiting the arrival of their OSAP funding. Appointments are required to determine your eligibility.

7.5 Scholarships

UOIT takes great pride in recognizing the academic achievements of students. Through the generous support of businesses, service organizations and individuals, the university is able to offer a number of scholarships and awards to assist undergraduate students with meeting the costs of their university education. A complete list is available at **www.uoit.ca**.

The subsections that follow detail the entrance scholarships and awards for the 2011-2012 academic year. Eligibility requirements and values are subject to change.

7.5.1 Entrance scholarships (application required)*

These scholarships are based on superior academic achievement, demonstrated leadership qualities, an essay, and a letter of support from the student's secondary school. Applications can be downloaded at **www.uoit.ca**.

Chancellor's Scholarship: One valued at $28,000 ($7,000 per year over four years). Recipients must maintain a minimum 3.7 GPA on a full course load.

President's Scholarships: Two valued at $24,000 each ($6,000 per year over four years). Recipients must maintain a minimum 3.7 GPA on a full course load.

Founder's Scholarships: Two valued at $20,000 each ($5,000 per year over four years). Recipients must maintain a minimum 3.7 GPA on a full course load.

The Naheed Dosani Entrance Scholarship: One valued at $1,000. Awarded to a student that can demonstrate impact of involvement, as well as personal growth through humanitarian action.

7.5.2 Awards of Recognition (no application required)*

UOIT recognizes academic achievement through automatic tuition credits issued upon admission to full-time students who have met minimum entering grade averages. Amounts and cut off averages vary from year to year. Awards of Recognition may not be combined with other UOIT scholarships.

7.5.3 Global Leadership Award for International Students (application required)*

International applicants currently studying full-time at a high school outside of Canada are eligible to apply to this scholarship. This scholarship is one of UOIT's most prestigious entrance awards. The recipients of this award will be academically outstanding and have made notable contributions in extracurricular or community activities. Applications can be downloaded at **www.uoit.ca**.

7.5.4 Project Hero Scholarship (application required)

UOIT will provide financial assistance towards the post-secondary education of dependents of Canadian Forces personnel killed while serving in an active military mission. A student who meets this criteria and who is also a citizen or permanent resident of Canada, under the age of 26, and registered as an undergraduate student at UOIT in a program of study eligible for funding by the province of Ontario is eligible to apply for the Project Hero Scholarship. Additional information and an application can be downloaded at **www.uoit.ca**.

7.5.5 In-Course Scholarships

Each year, students who excel academically at UOIT are awarded scholarships. There are no applications for these awards and qualified students within each faculty are selected and notified through their MyCampus email.

***Please note:**

- Values are subject to change;
- Awards of recognition and scholarships are only available to students applying to UOIT from secondary school within 18 months of graduation;
- Summer school and upgrading marks are not included in grade calculation for awards;
- Students must not have attended a post-secondary institution;
- Minimum 3.7 GPA required for renewal; and
- Students may not hold more than one UOIT scholarship simultaneously.

SECTION 8: STUDENT SERVICES

8.1 Introduction

The University of Ontario Institute of Technology (UOIT) provides a transformational educational experience that encourages students to reach their full potential. A team of student affairs professionals supports student achievement by delivering quality services that contribute to students' academic success and reduces non-academic barriers. Student engagement is cultivated through a living, learning environment that is committed to developing the whole student, while preparing tomorrow's leaders. For more information, including office locations and operational hours, visit **www.uoit.ca**.

8.2 First-Year and Transition Services

At UOIT, emphasis is given to building a learning community that is increasingly supportive of student success in all facets: intellectually, emotionally, socially and physically. During orientation programming, students will participate in events designed to help them meet their fellow classmates and gain insight from upper-year students, faculty, staff and administration about what to expect in their first year. There will also be opportunities to learn about the many campus clubs and activities students can get involved with during their time at UOIT and the campus services available to support their academic success.

UOIT recognizes that the transition to university sometimes presents unique experiences for students whose parents did not attend post-secondary studies. The Gen-F: Generation First Project is designed to facilitate and support the transition of these students through peer mentoring, online and in-person resources, and programming.

8.3 Student leadership

The wide variety of activities available makes life on campus a more rewarding and enriching experience. In keeping with this commitment, UOIT offers students the Co-curricular Recognition program to support and acknowledge student participation and leadership in campus activities. Student leadership programming supports all aspects of student leader development, student involvement and student leadership experiences on campus.

8.4 Academic assistance

The Academic Success Centre (ASC) at UOIT provides academic services in mathematics, writing, ESL, study skills and other academic subject areas through:

Consultations – Consultation sessions allow students to receive specialized academic assistance in a one-on-one appointment with an academic subject specialist. During a consultation session, students can seek assistance regarding particular questions they have or certain concepts they do not understand. Consultation sessions are 45 minutes in length.

Workshops – Workshop sessions provide an interactive way to demonstrate a difficult concept or method to a group of students. Workshops primarily focus on difficult concepts that trouble large groups of students. The ASC offers workshops based on student demand and if the number of students having trouble with a particular concept increases through one-on-one consultations, a workshop will be created to address the need. In addition, the ASC academic subject specialists will organize workshops to supplement course or program curriculum. New workshops are scheduled regularly.

Peer tutor services – UOIT's Peer Tutor program offers undergraduate students the opportunity to work one-on-one with a trained peer tutor. Students are encouraged to bring in their homework and assignments and seek focused assistance on difficult questions and concepts. Peer tutoring allows students to receive help based on their individual needs at the appropriate pace and level of instruction. Peer tutor services are available in many subject areas, which include, but are not limited to: math, chemistry, physics, programming, nursing and business.

ESL services – One-on-one tutorial sessions assist students to improve their English skills in academic writing and oral presentation. Also, the ACS offers conversation circles for second language students to practice their speaking skills.

8.5 Career Services

The Career Services team understands that everything a student encounters during his or her time at UOIT can help shape professional goals. Supporting students in creating their unique career path is one of the team's priorities.

Students and graduates can access a wide variety of resources and services to help them get started wherever they are in the career development process. Interactive career resources are available online through the Student Experience portal and in person at both the north Oshawa and downtown Oshawa locations.

Services include assistance with career exploration, creating effective job-search documents, finding student employment and making successful transitions into full-time careers or further education. Career Services also organizes various workshops, employer networking opportunities and recruitment events throughout the academic year.

The optional co-op and internship programs are co-ordinated centrally by this office. Co-op and internship experiences give students the opportunity to gain practical work experience related to their program of study. The Faculties of Energy Systems and Nuclear Science, Engineering and Applied Science, and Science encourage eligible students to participate and gain the advantage of having a paid practical work experience. Other faculties also offer valuable work placement opportunities. Visit the faculty sections of this calendar for details.

8.6 Personal financial counselling

One-to-one financial aid counselling is available to students needing to explore their options for funding their post-secondary education. The Student Awards and Financial Aid office also provides students with advice on how to prepare a school-year budget. This process encourages students to consider their income and expenses and enables a counsellor to identify potential problems and offer solutions. Through financial counselling, students can learn the skills required to keep their finances in good order.

8.7 Services for students with disabilities

UOIT is committed to facilitating the integration of students with disabilities into the university community. While all students must satisfy the essential requirements for courses and programs, accommodations, supports and services related to the student's disability needs are available at both UOIT locations to support students – through the Centre for Students with Disabilities at the north Oshawa location and through the Student Experience Centre – Disability Services at the downtown Oshawa location.

Reasonable academic accommodation may require members of the university community to exercise creativity and flexibility in responding to the needs of students with disabilities while maintaining academic standards.

This policy acknowledges that fundamental to the academic and personal success of students is their responsibility both to demonstrate self-reliance and to identify needs requiring accommodation.

The Centre for Students with Disabilities (north Oshawa location) and the Student Experience Centre – Disability Services (downtown Oshawa location) will support students with disabilities who require accommodations as legally required by the Ontario Human Rights Code.

Students are encouraged to contact the Centre for Students with Disabilities if they plan to attend UOIT's north Oshawa location and the Student Experience Centre – Disability Services if they will be studying at the downtown Oshawa location, so that the relevant supports can be put in place. Supports may include, but are not limited to, alternative testing arrangements, FM hearing systems, note takers, training and access to computers and adaptive software, alternative formats, interpreters, class assistants, counselling and learning strategies instruction.

8.8 Intercollegiate Athletic Academic Success Program

The Intercollegiate Athletic Academic Success Program (IAASP) encourages academic success for all varsity athletes through the establishment of academic standards and a comprehensive program of success strategies and advising.

8.9 Athletics

UOIT has a variety of facilities and spaces on campus to promote active and vibrant student life. They include an Athletic, Fitness and Health Centre with a triple gymnasium, 200m indoor running/walking track, group fitness studios, fitness classes, and student sports club space, a double gym and squash courts, indoor golf centre, a state-of-the-art year-round Tennis Centre with six clay courts, a new arena complex with two NHL size ice pads, a softball diamond, and a soccer field complex. These facilities are home to intramural, recreation and fitness programs offered on campus.

UOIT offers the following varsity sports programs for the competitive student-athlete – men's and women's tennis, men's and women's rowing, men's soccer, men's and women's hockey, and competitive dance. UOIT is the home of the Ridgebacks and is a member of Ontario University Athletics (OUA), the provincial voice for interuniversity sport, as well as a member of the Canadian Interuniversity Sport (CIS).

8.10 Chaplain services

Chaplain services are available to students in need through community services.

8.11 Campus Health Centre

The Campus Health Centre at the north Oshawa location is committed to providing the highest level of health care to all students of UOIT throughout the year. Whether you have a health emergency, a concern about nutrition or a bad case of the flu, you can expect care dispensed by health professionals who are friendly, concerned and accessible. Students studying downtown may prefer to access the more convenient Oshawa Clinic, which is a full-service clinic including urgent care services.

Located in the Campus Recreation and Wellness Centre at the north Oshawa location, our services include a medical clinic where you can receive medical assessment and treatment of illness or injury, annual health exams, laboratory testing and screening, birth control counselling and pregnancy testing, immunizations and allergy injections and a variety of health education services which include resources such as books, pamphlets, bulletin boards, web resources and health newsletters.

The Campus Health Centre contains the following services: an on-site pharmacy, physical therapy, massage therapy, nutritional counselling and chiropractic services along with student run, health resource centres: Leave The Pack Behind and the Sexual Health Resource Centre.

If you require assistance dealing with relationship issues, family problems, stress, depression, or other personal problems, a team of counselling professionals are available at the north Oshawa location through the Campus Health Centre and at the downtown Oshawa location through Oshawa Psychological and Counselling Services to help by providing support, discussion, therapy and education, and/or referrals.

The Campus Health Centre also provides placement opportunities for students in a variety of university programs, as well as a volunteer placement program.

8.12 Residence

UOIT residence is a modern home away from home. It provides students with the opportunity to participate fully in campus activities and to mature and develop responsibility in a rich academic and social environment. Residence facilities are located on campus and offer students a safe and convenient living solution. Residence staff are committed to making your experience both memorable and rewarding.

8.13 Off-Campus Living Service

UOIT's Off-Campus Living Service provides support and assistance for students living off-campus. In addition to a rental listing service, general housing information and advice are available. This service offers a wealth of resources designed to promote a safe, neighbourly, and successful community for all to enjoy.

8.14 Student government

Your Student Association represents the body of students on campus and is the voice of the students to governing bodies. The association's office is located on the second floor of the Student Centre.

8.15 Student conduct

Student conduct at UOIT is governed by the Policy on Student Conduct and Disciplinary Procedures in Non-academic Matters*. Students have a responsibility to familiarize themselves with this policy and the conduct that is expected of them while studying at UOIT, which includes but is not limited to:

- Abiding by university regulations, policies and by-laws and/or complying with directions of university officials, police or other law enforcement officers acting in the performance of their duties;
- Respecting the rights of other members of the university community who study, work and live within it and refraining from conduct that endangers the physical and mental well-being, health, safety, civil or human rights and property of self and/or others within the university community or visitors to the university;
- Refraining from conduct that may damage, destroy, or constitutes fraudulent use of university property;
- Refraining from conduct that jeopardizes the good order and proper functioning of the academic and non-academic programs and activities of the university and its faculties and offices;
- Refraining from making allegations or complaints against other members of the university community that are frivolous, vexatious or made in bad faith, and from retaliating against individuals for participating in proceedings under this policy; and
- Abiding by federal, provincial or municipal laws.

For matters involving conduct issues, the student in question will be contacted through the UOIT MyCampus email system. It is the student's responsibility to ensure that this account is monitored regularly.

Student safety at UOIT is paramount and the Office of Campus Safety continually strives to provide a responsive and effective response to any issues of concern. Should an issue arise in which the health or safety of our students, staff or faculty comes into question, a multidisciplinary assessment team is available, as required, to assess and respond to the situation. At times it may be necessary to share personal information strictly for the purposes of ensuring a safe and effective response.

*The Policy on Student Conduct and Disciplinary Procedures in Non-academic Matters is available on UOIT's website at **www.uoit.ca/studentconduct**.

SECTION 9: FACULTY OF BUSINESS AND INFORMATION TECHNOLOGY

Dean: Pamela Ritchie, BA, MSc, PhD

Associate dean: Stephen Rose, HBBA, MBA

Professors:

Terry Y. S. Wu, BA, MA, PhD

Associate professors:

John Friedlan, BSc, MBA, PhD, CA

William M. Goodman, BA, MA, PhD

Patrick C.K. Hung, BSc, MPhil, MASc, PhD

Salma Karray, BBA, MSc, PhD

Carolyn McGregor, BAppSc (Hons), PhD
(Cross-appointment with the Faculty of Health Sciences)

Miguel Vargas Martin, BSc, MASc, PhD, PEng

Assistant professors:

Bin Chang, LLB, BA, MA, PhD

Cuiping Chen, BEng, MA, PhD

Shantanu Dutta, BTech, MEngMgmt, MBA, PhD

Khalil El-Khatib, BCompSc, MCompSc, PhD

Tripat Gill, BTech, MBA, PhD

Shahram S. Heydari, BSc M.Sc, MASc, PhD

Andrew Hogue, BSc, MSc, PhD

Ying (Annie) Jiang, BA, MPhil, PhD

Bill Kapralos, BSc, MSc, PhD

Igor Kotlyar, BComm, MBA, PhD

Joseph Krasman, BAS, MBA, PhD

Jing (Jill) Lei, BSc, MSc, PhD

Xiaodong Lin, BSc, MSc, CISSP

Zhenfeng Ma, BA, MA, PhD

Jeff Moretz, BA, MBA, PhD

Jennifer Percival, BMath, PhD

Suhaib Riaz, BSc-Eng, MBA, PhD

Wei Shi, BEng, MCompSci, PhD

Kamal Smimou, BSc, MBA, PhD

Chirag Surti, BEng, MS, PhD

Julie Thorpe, PhD

Ying Zhu, BSc, MSc, PhD
(Cross-appointment with the Faculty of Engineering and Applied Science)

Lecturers:

Jane Bowen, BCom, CA

Snezhy Neshkova, MSc

Ferdinand Jones, BA, CMA

Academic advisors:

Jessica Clarke, BBA

Aaron Mitchell, BBA

Christina Pearsall, BA

www.businessandit.uoit.ca

9.1 Degrees offered

Bachelor of Commerce (Honours) – BCom (Hons)

- Accounting major and minor;
- Finance major and minor;
- Marketing major and minor;
- Organizational Behaviour and Human Resources Management major and minor; and
- Bridge program.

Bachelor of Information Technology (Honours) – BIT (Hons)

- Game Development and Entrepreneurship specialization;
- Networking and Information Technology Security specialization; and
- Bridge program.

The Faculty of Business and Information Technology offers innovative degree programs in Commerce and Information Technology. By placing a strong emphasis on how technology can enhance business opportunities, students are prepared to launch successful careers in business and industry.

The faculty's research focuses on the areas of business process integration and management, risk management, international business, marketing, corporate governance, and information technology security. The faculty also promotes commercialization of technology.

UOIT also offers a Master of Information Technology Security (MITS) program and a Master of Business Administration (MBA) program. For more information about UOIT graduate programs and opportunities, please refer to the graduate studies website at **www.gradstudies.uoit.ca**.

9.2 Program information – Bachelor of Commerce (Honours)

9.2.1 General information

The Bachelor of Commerce (Honours) degree prepares graduates with strong employability skills and the foundations for excellence in managing business corporations.

Organizations are examined from a number of perspectives, including how they are managed and the changing environments in which they operate. National and international contexts of business are explored, along with relevant issues facing managers in business, labour and the public sector.

Students receive extensive practice in applying theory to the processes of decision-making and problem-solving through computer-based exercises and simulations, case study analyses, problem-based learning activities and field-based projects.

Year two, the core year, is an introduction to each of the functional areas of business – accounting, finance, organizational behaviour and human resources, and marketing – and an examination of the ways in which these are integrated within an operation. In years three and four, students may choose to major or major and minor in one or more functional areas, such as accounting, marketing, finance or organizational behaviour and human resources management.

In year four, students benefit from the UOIT Edge – Capstone Study Project and Strategic Management courses.

These unique courses provide an opportunity to consolidate learning from earlier years of the program on the site of a partnering organization and under the supervision of both university faculty and the organization's management team. In lieu of UOIT Edge – Capstone Study Project, qualified students may also enrol in the Internship program as described in Section 9.2.3.

9.2.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a recommended minimum average of 60 per cent or better and one of Advanced Functions (MHF4U) or Calculus and Vectors (MCV4U) or Mathematics of Data Management (MDM4U) with a recommended minimum average of 60 per cent or better. All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

9.2.3 Internship program

This program offers students who have successfully completed 2.5 years of study, including having achieved a cumulative 3.3 GPA (B+) average, an opportunity to engage in a contracted learning partnership with businesses in the Durham region or around the globe. Our faculty may provide links to various internship placement opportunities or a student may secure an employer who meets the criteria as prescribed by the Faculty of Business and Information Technology. The internship program not only gives students an opportunity to apply classroom concepts to the challenges of organizational life, but also helps them to gain valuable and relevant work experience to promote networking and life-long career success. Participating employers are given the opportunity to bring the motivated learners, thinkers, and doers of tomorrow into their workplaces, as well as provide valuable mentoring to students.

The internship program placement equates to 560 hours of progressive business and management experience. The intern's wages (stipulated in a contract) are paid by the sponsoring business over a contracted period. Successful work placement completion and both a verbal and written final report will result in the intern receiving a mark and three credits toward the BCom (Hons) degree requirements. Students who have successfully completed the Internship program are not required to take the UOIT Edge – Capstone Study Project.

9.2.4 Careers

Employment opportunities are well above average, with a range of career possibilities or continuation of studies at graduate school. High demand exists for accountants, auditors, financial investment analysts, information technology experts, market research analysts, marketing managers, or advertising executives.

9.2.5 Degree requirements

To be eligible for the BCom (Hons) degree, students must successfully complete 120 credit hours, including all courses outlined in the following program map. For course descriptions, see Section 16.

Students may choose a major in one of the following four areas: Accounting, Finance, Marketing or Organizational Behaviour and Human Resources Management. As an option, students may also complete a minor from one of the above-mentioned areas. Refer to Section 9.2.6 through 9.2.9 for detailed requirements for each major and minor.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.businessandit.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
BUSI 1010U Critical Thinking and Ethics
BUSI 1520U Business Computer Applications
BUSI 1600U Management of the Enterprise
BUSI 1915U Linear Algebra
ECON 2010U Microeconomics

Semester 2 (15 credit hours)
BUSI 1020U Business Communications
BUSI 1450U Statistics
BUSI 2150U Financial Accounting I
ECON 2020U Macroeconomics
Elective*

YEAR 2

Semester 1 (15 credit hours)
BUSI 1916U Introductory Calculus
BUSI 2160U Financial Accounting II
BUSI 2201U Marketing I
BUSI 2311U Organizational Behaviour
BUSI 2401U Finance I

Semester 2 (15 credit hours)
BUSI 2170U Managerial Accounting
BUSI 2202U Marketing II
BUSI 2312U Introduction to Human Resources Management
BUSI 2402U Finance II
BUSI 2603U Introduction to Operations Management

YEAR 3

Semester 1 (15 credit hours)
BUSI 3040U Information Systems or
BUSI 3705U Legal Environment of Business
Major course
Major course
Two electives*

Semester 2 (15 credit hours)
BUSI 3040U Information Systems or
BUSI 3705U Legal Environment of Business
Major course
Major course
Major course
Elective*

YEAR 4

Semester 1 (15 credit hours)
BUSI 4701U Strategic Management
BUSI 4995U UOIT Edge – Capstone Study Project
Major course
Elective*
Elective*

Semester 2 (15 credit hours)
Major course
Major course
Three electives*

***Electives**

A total of 27 credit hours (9 electives) which must consist of:

- A minimum of 6 credit hours (2 electives), but no more than 12 credit hours (4 electives) in BUSI courses which are NOT one's major.
- No more than 6 credit hours (2 electives) in additional BUSI courses from one's own major.
- At least 9 credit hours (3 electives) in the area outside Business (BUSI prefix).

9.2.6 Program details – Accounting major and minor

9.2.6.1 Accounting major

The Accounting major is designed for students interested in careers as professional accountants. The program will allow students to meet the course requirements of the three Canadian accounting professional designations: Chartered Accountant (CA), Certified Management Accountant (CMA), and Certified General Accountant (CGA). The program provides a heavy emphasis on accounting-related courses combined with broad coverage of the major business disciplines.

A major in Accounting requires a minimum of 30 credit hours in accounting courses. Students must complete six accounting core courses and a minimum of four accounting elective courses.

Accounting core courses
BUSI 2150U Financial Accounting I
BUSI 2160U Financial Accounting II
BUSI 2170U Managerial Accounting
BUSI 3101U Intermediate Financial Accounting I
BUSI 3102U Intermediate Financial Accounting II
Plus one of: BUSI 3110U Introduction to Taxation or
BUSI 3170U Auditing Standards and Applications or
BUSI 3160U Advanced Managerial Accounting

Accounting electives
Note: Accounting core courses may not be used as accounting electives.

BUSI 3110U Introduction to Taxation
BUSI 3120U Advanced Taxation
BUSI 3150U Financial Statement Analysis
BUSI 3160U Advanced Managerial Accounting
BUSI 3170U Auditing Standards and Applications
BUSI 3171U Advanced Auditing
BUSI 3172U Auditing Information Systems
BUSI 4101U Advanced Financial Accounting
BUSI 4140U Contemporary Issues in Accounting
BUSI 4190U Special Topics in Accounting

9.2.6.2 Accounting minor

The Bachelor of Commerce (Honours) degree with an Accounting minor requires a minimum of 18 credit hours in accounting courses. Students must complete four accounting core courses and a minimum of two accounting elective courses.

Accounting core courses
BUSI 2150U Financial Accounting I
BUSI 2160U Financial Accounting II
BUSI 2170U Managerial Accounting
BUSI 3101U Intermediate Financial Accounting I

Accounting electives
BUSI 3110U Introduction to Taxation
BUSI 3120U Advanced Taxation
BUSI 3150U Financial Statement Analysis
BUSI 3160U Advanced Managerial Accounting
BUSI 3170U Auditing Standards and Applications
BUSI 3171U Advanced Auditing
BUSI 3172U Auditing Information Systems
BUSI 4101U Advanced Financial Accounting
BUSI 4140U Contemporary Issues in Accounting
BUSI 4190U Special Topics in Accounting

9.2.6.3 Accounting professional designations

The following courses are offered to meet the requirements of the professional designations indicated:

Course	Title	CA[1]	CGA[4]	CMA[6]
BUSI 1101U	Financial Accounting	√[2]	√[5]	√[5]
BUSI 2150U	Financial Accounting I	√	√	√
BUSI 2160U	Financial Accounting II	√	√	√
BUSI 2170U	Managerial Accounting	√	√	√
BUSI 3101U	Intermediate Financial Accounting I	√	√	√
BUSI 3102U	Intermediate Financial Accounting II	√	√	√
BUSI 3110U	Introduction to Taxation	√	√	√
BUSI 3120U	Advanced Taxation	√	√[7]	√
BUSI 3150U	Financial Statement Analysis	√[3]		
BUSI 3160U	Advanced Managerial Accounting	√	√	√
BUSI 3170U	Auditing Standards and Applications	√	√	√
BUSI 3171U	Advanced Auditing	√	√[7]	
BUSI 3172U	Auditing Information Systems	√		
BUSI 4101U	Advanced Financial Accounting	√	√	√
BUSI 4140U	Contemporary Issues in Accounting	√[3, 8]	√[8]	
BUSI 4190U	Special Topics in Accounting – Critical Thinking, Analysis and Decision Making	√[3, 8]		
BUSI 1010U	Critical Thinking and Ethics		√	
BUSI 1020U	Business Communications		√	
BUSI 1450U	Statistics		√	√
BUSI 2201U	Marketing I		√	
BUSI 2202U	Marketing II		√	
BUSI 2311U	Organizational Behaviour			√
BUSI 2312U	Introduction to Human Resources Management			√
BUSI 2401U	Finance I	√	√	√
BUSI 2402U	Finance II	√	√	√
BUSI 2603U	Introduction to Operations Management		√	√
BUSI 3040U	Information Systems	√	√	√
BUSI 3705U	Legal Environment of Business	√	√	
BUSI 4410U	Advanced Corporate Finance		√[7]	
BUSI 4701U	Strategic Management I			√
ECON 2010U	Microeconomics	√	√	√
ECON 2020U	Macroeconomics	√	√	√

Please see page 52 for explanatory notes pertaining to this chart.

[1] UOIT's Accounting major enables students to meet the 51 credit hours required by the Institute of Chartered Accountants of Ontario.

[2] Students in the UOIT Commerce Bridge program take BUSI 1101U instead of BUSI 2150U and BUSI 2160U. To meet the advanced accounting requirements and to obtain the necessary 51 credit hours required by the Institute of Chartered Accountants of Ontario, students who complete BUSI 1101U should take BUSI 4101U plus two of BUSI 3150U, BUSI 4140U, and BUSI 4190U.

[3] To meet the advanced accounting requirements of the Institute of Chartered Accountants of Ontario students in the Bachelor of Commerce (Honours) program should take BUSI 4101U plus one of BUSI 3150U, BUSI 4140U, and BUSI 4190U. For students who complete BUSI 1101U instead of BUSI 2150U and BUSI 2160U, please see note 2.

[4] The UOIT BComm program is accredited by CGA Ontario as meeting the requirements for direct entry into its program at the PACE level.

[5] Students in the UOIT Commerce Bridge program take BUSI 1101U instead of BUSI 2150U and BUSI 2160U.

[6] UOIT's Accounting major enables students to complete the prerequisite courses for the CMA program and be eligible to write the CMA entrance examination in the year of graduation.

[7] CGA students are required to take two elective Career Option courses as part of the PACE level of the program. By completing the courses indicated in the table students can write a CGA challenge exam instead of taking the course offered by the CGA. See the CGA website for more information.

[8] May not be offered each year.

Note: UOIT does not control the recognition of courses by the professional bodies, please verify with your intended designation's accreditation institute, or online through their respective websites.

9.2.7 Program details – Finance major and minor

The Finance major is offered to students interested in careers in corporate and government finance, banking, financial planning and investments. Finance graduates pursue a career with jobs such as financial analysts, loan officers, traders (in markets such as stocks, bonds, currencies, futures, options and swaps), portfolio managers, security analysts, credit managers, budget directors, investment advisors, treasurers, financial planners, insurance representatives, and investment bankers. The Finance major curriculum offers a variety of courses with topic coverage in equity analysis, derivative securities, portfolio management, fixed income security analysis, working capital management, advanced corporate finance applications and mergers and acquisitions to name a few.

The Finance major helps prepare students for the professional designations of CFP and CFA, as well as the CSI exam.

9.2.7.1 Finance major

The Finance major in the Bachelor of Commerce (Honours) program requires a minimum of 30 credit hours in finance courses. Students must complete six required finance courses and a minimum of four finance elective courses.

Finance core courses
BUSI 2401U Finance I
BUSI 2402U Finance II
BUSI 3405U Equity Asset Analysis
BUSI 3410U Financial Institutions
BUSI 3420U Derivative Securities
BUSI 4410U Advanced Corporate Finance Applications

Finance elective courses
BUSI 3150U Financial Statement Analysis
BUSI 3430U Personal Finance
BUSI 3440U Financial Application Tools
BUSI 3460U Fixed Income Strategies
BUSI 3480U International Finance
BUSI 4405U Portfolio and Investment Strategies
BUSI 4420U Working Capital Management
BUSI 4430U Mergers and Acquisitions
BUSI 4490U Special Projects in Finance
BUSI 4499U Directed Independent Studies in Finance

9.2.7.2 Finance minor

The Finance minor in the Bachelor of Commerce (Honours) program requires a minimum of 18 credit hours in finance courses. Students must complete four required finance courses and a minimum of two additional finance courses.

Finance required courses for the minor
BUSI 2401U Finance I
BUSI 2402U Finance II
BUSI 3410U Financial Institutions
BUSI 3430U Personal Finance

Finance minor elective courses
BUSI 3150U Financial Statement Analysis
BUSI 3405U Equity Asset Analysis
BUSI 3420U Derivative Securities
BUSI 3440U Financial Application Tools
BUSI 3460U Fixed Income Strategies
BUSI 3480U International Finance
BUSI 4405U Portfolio and Investment Strategies
BUSI 4410U Advanced Corporate Finance Applications
BUSI 4420U Working Capital Management
BUSI 4430U Mergers and Acquisitions
BUSI 4490U Special Projects in Finance
BUSI 4499U Directed Independent Studies in Finance

9.2.8 Program details – Marketing major and minor

The Marketing major provides students with rigorous training in the topics of consumer behaviour, marketing research, advertising, promotions, and strategy formulation in a dynamic marketing environment. The curriculum is designed to prepare students with the latest skills and perspectives essential for careers in marketing, advertising, sales management, product/brand management, retailing, e-marketing and marketing research. The use of technology both within and outside our Marketing Lab, including simulations, Internet exercises, projects and marketing software, is emphasized as a strong component of the different major courses in marketing.

9.2.8.1 Marketing major

The Bachelor of Commerce (Honours) degree with a major in Marketing requires a minimum of 30 credit hours in marketing courses. Students must complete six marketing core courses and a minimum of four marketing elective courses.

Marketing core courses
BUSI 2201U Marketing I
BUSI 2202U Marketing II
BUSI 3210U Consumer Behaviour
BUSI 3260U Marketing Research
BUSI 3503U E-Marketing
BUSI 4220U Marketing Strategy

Marketing electives
BUSI 3200U Marketing Communications
BUSI 3220U Sales Management
BUSI 3230U Marketing Channels
BUSI 3240U Merchandising, Planning and Control
BUSI 3250U Service Marketing
BUSI 3280U Brand Management
BUSI 4203U Advertising Management
BUSI 4210U High-Tech Marketing
BUSI 4230U Quantitative Marketing Analysis
BUSI 4240U Retail Management
BUSI 4250U International Marketing
BUSI 4270U Business to Business Marketing
BUSI 4290U Special Topics in Marketing
BUSI 4299U Directed Independent Study in Marketing

9.2.8.2 Marketing minor

The Bachelor of Commerce (Honours) degree with a minor in Marketing requires a minimum of 18 credit hours in marketing courses. Students must complete four marketing core courses and a minimum of two marketing elective courses.

Marketing core courses
BUSI 2201U Marketing I
BUSI 2202U Marketing II
BUSI 3210U Consumer Behaviour
BUSI 3260U Marketing Research

Marketing electives
BUSI 3200U Marketing Communications
BUSI 3220U Sales Management
BUSI 3230U Marketing Channels
BUSI 3240U Merchandising, Planning and Control
BUSI 3250U Service Marketing
BUSI 3280U Brand Management
BUSI 3503U E-Marketing
BUSI 4203U Advertising Management
BUSI 4210U High-Tech Marketing
BUSI 4220U Marketing Strategy
BUSI 4230U Quantitative Marketing Analysis
BUSI 4240U Retail Management
BUSI 4250U International Marketing
BUSI 4270U Business to Business Marketing
BUSI 4290U Special Topics in Marketing
BUSI 4299U Directed Independent Study in Marketing

9.2.9.1 Organizational Behaviour and Human Resources Management major

The Bachelor of Commerce (Honours) degree with a major in Organizational Behaviour and Human Resources Management requires a minimum of 30 credit hours in organizational behavior and human resources management courses. Students must complete the eight human resources management courses and a minimum of two human resources management elective courses.

Organizational Behaviour and Human Resources Management core courses:
BUSI 2311U Organizational Behaviour
BUSI 2312U Introduction to Human Resources Management
BUSI 3305U Recruiting and Selection
BUSI 3312U Industrial and Labour Relations
BUSI 3340U Human Resource Planning
BUSI 3360U Health and Safety
BUSI 3380U Compensation and Benefits
BUSI 3390U Training and Development

Organizational Behaviour and Human Resources Management elective courses:
BUSI 3810U International Management
BUSI 3820U International Human Resources Management
BUSI 3315U Negotiation Theory and Behaviour
BUSI 3319U Conciliation and Dispute Resolution
BUSI 3370U Employment and Labour Laws
BUSI 4390U Special topics in OB and HRM
BUSI 4399U Directed Independent Study in OB and HRM

9.2.9.2 Organizational Behaviour and Human Resources Management minor

The Bachelor of Commerce (Honours) degree with a minor in Organizational Behaviour and Human Resources Management requires a minimum of 18 credit hours in organizational behaviour and human resources management courses. Students must complete the two organizational behavior and human resources management courses and a minimum of four organizational behavior and human resources management elective courses.

Organizational Behaviour and Human Resources Management core courses
BUSI 2311U Organizational Behaviour
BUSI 2312U Introduction to Human Resources Management

Organizational Behaviour and Human Resources Management elective courses
BUSI 3305U Recruiting and Selection
BUSI 3312U Industrial and Labour Relations
BUSI 3340U Human Resource Planning
BUSI 3360U Health and Safety
BUSI 3380U Compensation and Benefits
BUSI 3390U Training and Development
BUSI 3315U Negotiation Theory and Behaviour
BUSI 3319U Conciliation and Dispute Resolution
BUSI 3370U Employment and Labour Laws
BUSI 4390U Special Topics in OB and HRM
BUSI 4399U Directed Independent Study in OB and HRM

9.3 Program information – Commerce Bridge program

9.3.1 General information

The Commerce Bridge provides students with the opportunity to apply the diploma or degree they have already earned toward a Bachelor of Commerce (Honours) degree at UOIT. Graduates from a three-year Ontario College Advanced business diploma (or equivalent) with a minimum 3.0 GPA (on a 4.3 scale) may flow directly to third year of the Bachelor of Commerce (Hons) program. Two-year Ontario College business diploma (or equivalent) graduates with a minimum 3.0 GPA (on a 4.3 scale) have the option of taking the five bridge courses offered and would then proceed to the third year of the Bachelor of Commerce (Hons) program. Those graduates with an Ontario College non-business diploma with a minimum 3.0 GPA (on a 4.3 scale) will be required to complete the five Bridge courses in as little as one semester. Upon successful completion of the bridge program with a cumulative 3.0 GPA (on a 4.3 scale) or better, students may proceed directly to the third year of the Bachelor of Commerce (Hons) program.

9.3.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

To qualify for the Commerce Bridge program, students must have a minimum of any two- or three-year Ontario College diploma (or equivalent) with a cumulative B average or better or any three-year university degree with a cumulative B average or better.

9.3.3 Bridge completion requirements

Bridge Courses (2-year business diploma graduates)
- BUSI 1010U Critical Thinking and Ethics;
- BUSI 1916U Business Math II;
- BUSI 2170U Managerial Accounting;
- BUSI 2311U Organizational Behaviour; and
- BUSI 2401U Finance I.

Bridge Courses (2- or 3-year non-business diploma graduates)
- BUSI 1101U Financial Accounting;
- BUSI 1450U Statistics;
- BUSI 2401U Finance I;
- BUSI 2402U Finance II; and
- BUSI 2170U Managerial Accounting.

9.4 Program information – Bachelor of Information Technology (Honours)

9.4.1 General information

The information technology (IT) profession requires university graduates who have the necessary education and skills to work in the fast-paced world of IT. UOIT's Bachelor of Information Technology (Honours) degree offers two specializations, including Game Development and Entrepreneurship, and Networking and Information Technology Security. Each specialization provides students with the knowledge and skills to be successful in the IT field.

9.4.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a recommended minimum average of 60 per cent or better and one of Advanced Functions (MHF4U) or Calculus and Vectors (MCV4U) or Mathematics of Data Management (MDM4U) with a recommended minimum average of 60 per cent or better.

9.4.3 Field placement opportunities

The program offers students who have successfully completed all the requirements of the first three years of the Information Technology program with an opportunity to engage in a contracted learning partnership with businesses in the Durham region and Greater Toronto Area (GTA), as well as around the globe. The student secures an employer who meets the criteria as prescribed by the Faculty of Business and Information Technology. The internship program not only gives students an opportunity to apply classroom concepts to the challenges of organizational life, but also helps them to gain valuable and relevant work experience to promote networking and life-long career success. Participating employers are given the opportunity to bring the motivated learners, thinkers, and doers of tomorrow into their workplaces, as well as provide valuable mentoring to students.

An internship placement equates to 560 hours of progressive business and management experience. Successful work placement completion and final report submission will result in the intern receiving a mark and three credits toward the Bachelor of Information Technology (Honours) degree requirements. Students who have successfully completed the Internship program are not required to take the UOIT Edge – Capstone Study Project.

Admission to the internship program is competitive and applicants must have a minimum cumulative 3.3 GPA (B+) average to be eligible.

9.4.4 Careers

Graduates from the Game Development and Entrepreneurship specialization are prepared for all roles in the game development field and are equipped with the knowledge required to launch their own game development enterprise.

The specialization in Networking and Information Technology Security prepares students for management, supervisory or specialist roles as information security officers, network administrators, technical support managers, IT trainers, database managers, custom PC application developers, and many other careers.

The Bachelor of Information Technology (Honours) prepares graduates for a variety of post-graduate opportunities.

9.4.5 Program details and degree requirements

9.4.5.1 Program details – Game Development and Entrepreneurship specialization

Game Development and Entrepreneurship is designed to provide students with a wide range of game design and programming expertise. Students are introduced to game technology and theory, and to the artistic and creative aspects of game development. An innovative gaming and virtual reality laboratory is central to the program and features state-of-the-art equipment, including 30 Dell XPS 720 workstations, motion capture facilities, an audiometric (sound) room, and 3D (stereo projector) displays. Students acquire business and management knowledge and develop entrepreneurial skills, allowing graduates to quickly advance their careers in the game industry as employees or entrepreneurs in charge of developing and managing their own gaming businesses.

Students may take business minor courses to obtain a minor in Marketing.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.businessandit.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
INFR 1010U Discrete Mathematics
INFR 1100U Introduction to Programming
INFR 1300U Creative Writing and Narrative Concepts
INFR 1310U Graphic Design I
INFR 1340U Business of Gaming

Semester 2 (15 credit hours)
BUSI 1700U Introduction to Entrepreneurship
INFR 1015U Linear Algebra and Physics for Games
INFR 1320U Graphic Design II
INFR 2140U Object Oriented Programming
General elective*

YEAR 2

Semester 1 (15 credit hours)
BUSI 2205U Principles of Marketing
INFR 1350U Introduction to Computer Graphics (formerly Photographic & Image Processing Techniques)
INFR 2310U Computer Animation: Algorithms and Techniques
INFR 2810U Computer Architecture
INFR 2820U Algorithm and Data Structures

Semester 2 (15 credit hours)
BUSI 2120U Accounting for IT
INFR 2330U Game Design and Production I
INFR 2350U Intermediate Computer Graphics
INFR 2370U Sound and Audio
BUSI 2700U Entrepreneurial Finance

YEAR 3

Semester 1 (15 credit hours)
BUSI 2550U Introduction to Project Management (formerly INFR 2550U Information Technology Project Management)
INFR 3110U Game Engine Design and Implementation
INFR 3340U Intermediate Modelling Techniques (formerly Intermediate Animation Techniques)
General elective* or Business minor elective**
General elective* or Business minor elective**

Semester 2 (15 credit hours)
INFR 3310U Animation and Production (formerly Advanced Graphics and Animation)
INFR 3320U Filmmaking
INFR 3330U Game Design and Production II
INFR 3830U Distributed Systems and Networking
General elective* or Business minor elective**

YEAR 4

Semester 1 (15 credit hours)
BUSI 3750U Advanced Entrepreneurship
BUSI 4995U UOIT Edge – Capstone Study Project
INFR 4320U Artificial Intelligence for Gaming
INFR 4350U Virtual Reality and User Interaction
General elective* or Business minor elective**

Semester 2 (15 credit hours)
BUSI 4996U Internship or Business minor elective** or Technical elective***
INFR 4310U Multiplayer and Online Game Development
INFR 4390U Demo Reel Development
INFR 4391U Special Topics in Game Development and Entrepreneurship
General elective* or Business minor elective**

9.4.5.2 Program details – Networking and Information Technology Security specialization

Computer networking has become an integral part of today's business environment. The specialization in Networking and IT Security prepares graduates with knowledge and skills in planning, designing, installing, operating, managing, and securing information technology infrastructure. The core curriculum includes mandatory courses in business and management in addition to technical courses, providing students with the necessary business background and technological skills to make significant contributions in today's workplace. The coursework prepares graduates to manage the continuing changes and challenges of the IT profession. This program also prepares graduates for two levels of the Cisco certification program, namely, Cisco Certified Network Associate (CCNA®), Cisco Certified Network Professional (CCNP). Cisco Certified Internetwork Expert (CCIE®) will be offered as technical elective.

Students may take business minor course to obtain a minor in Marketing.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.businessandit.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
INFR 1010U Discrete Mathematics
INFR 1100U Introduction to Programming
INFR 1411U Introduction to Networking I
INFR 1550U Law & Ethics in IT

Semester 2 (15 credit hours)
BUSI 1700U Introduction to Entrepreneurship
INFR 1016U Introductory Calculus
INFR 1421U Introduction to Networking II
INFR 2140U Object Oriented Programming
General elective*

YEAR 2

Semester 1 (15 credit hours)
BUSI 2205U Principles of Marketing
BUSI 2550U Introduction to Project Management (formerly INFR 2550U Information Technology Project Management)
INFR 2411U Advanced Networking I
INFR 2810U Computer Architecture
INFR 2820U Algorithm and Data Structures

Semester 2 (15 credit hours)
BUSI 3501U E-Business Technologies
INFR 2421U Advanced Networking II
INFR 2600U Introduction to Computer Security
INFR 2830U Operating Systems
General elective*

YEAR 3

Semester 1 (15 credit hours)
INFR 2431U Advanced Networking III
INFR 3120U Web Programming
INFR 3600U Cryptography and Network Security
INFR 3710U Signals and Random Processes
General elective* or Business minor elective**

Semester 2 (15 credit hours)
INFR 3610U Operating Systems Security
INFR 3720U Basics of Digital Transmission
INFR 3810U Database Systems
INFR 3850U Enterprise Network Management
General elective* or Business minor elective**

YEAR 4

Semester 1 (15 credit hours)
BUSI 4995U UOIT Edge – Capstone Study Project
INFR 4599U Special Topics in Information Technology
INFR 4680U IT Security Policies and Procedures
Technical elective***
General elective* or Business minor elective** or Technical elective***

Semester 2 (15 credit hours)
BUSI 4996U Internship or Business minor elective** or Technical elective***
INFR 4660U Web Services and E-Business Security
INFR 4690U IT Forensics
Technical elective***
General elective* or Business minor elective**

***General elective**
Students may select any non-INFR course from any faculty, subject to credit restrictions. See course descriptions in Section 16.

****Business minor elective**
Students may enrol in selected BUSI courses as business minor electives to receive a minor in Marketing. Details will be available in the schedule of classes.

*****Technical elective**
Students may enrol in selected INFR courses as technical electives. Details will be available in the schedule of classes.

9.5 Program information – Information Technology Bridge program

9.5.1 General information

The Information Technology Bridge program provides students with the opportunity to apply the Ontario College diploma (or equivalent) or degree they have already earned toward a Bachelor of Information Technology (Honours) degree at UOIT.

Upon successful completion of the bridge program with a cumulative 3.0 GPA (on a 4.3 scale) or better, students may apply directly to the third year of the Bachelor of Information Technology (Honours) degree.

9.5.2 Information Technology Bridge program – Game Development and Entrepreneurship specialization

9.5.2.1 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

To qualify for the Information Technology Bridge – Game Development and Entrepreneurship specialization, students must have a completed two- or three-year Game Development Ontario College diploma (or equivalent) with a cumulative B average or better or three-year university degree with a cumulative B+ average or better. Graduates of two- or three-year Ontario College diploma programs in other disciplines should contact UOIT to determine their admission eligibility for this program.

9.5.2.2 Bridge completion requirements

- BUSI 1700U Introduction to Entrepreneurship;
- INFR 1010U Discrete Mathematics;
- INFR 1015U Linear Algebra and Physics for Games;
- INFR 2140U Object Oriented Programming; and
- INFR 2810U Computer Architecture.

9.5.3 Information Technology Bridge program – Networking and Information Technology Security specialization

9.5.3.1 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

To qualify for the Information Technology Bridge – Networking and Information Technology Security specialization, students must have a completed two- or three-year Computer Systems Technology Ontario College diploma (or equivalent) with a cumulative B average or better.

9.5.3.2 Bridge completion requirements

- BUSI 1700U Introduction to Entrepreneurship;
- INFR 1010U Discrete Mathematics;
- INFR 1016U Introductory Calculus;
- INFR 2810U Computer Architecture; and
- One general or Technical elective.

SECTION 10: FACULTY OF EDUCATION

Dean: Jim Greenlaw, BA (Hons), BEd, MA (T), PhD

Program director: Graduate Programs

Lorayne Robertson, BA, BEd, MEd, EdD

Program director: BEd Program

Roland Van Oostveen, BSc (Hons), MEd, PhD

Professor:

William Hunter, BA, PhD

Associate professors:

Francois Desjardins, BA, BEd, PhD

Robin Kay, BSc, MA, PhD

Roland van Oostveen, BSc (Hons), MEd, PhD

Assistant professors:

Shawn Bullock, BSc (Hons), BEd, MEd, PhD

Maurice DiGiuseppe, BSc, BEd, MEd, PhD

Allyson Eamer, BA, BEd, MEd, PhD

Janette Hughes, BA, BEd, MA (T), PhD

Jennifer Laffier, BA, MA, RCAT, PhD (candidate)

Ann LeSage, BSc (Hons), BEd, MEd, PhD

Diana Petrarca, BSc (Hons), BEd, MEd

Lorayne Robertson, BA, BEd, MEd, EdD

Nick Scarfo, BA, Med, PhD

Shirley Van Nuland, BA, BEd, MEd, PhD

Academic advisor:

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www.education.uoit.ca

10.1 Degrees offered

Bachelor of Education (Primary/Junior) – BEd

Bachelor of Education (Intermediate/Senior) – BEd

Bachelor of Science (Honours)/Bachelor of Education (Intermediate/Senior) – BSc (Hons)/BEd

The Faculty of Education enables students to develop communication, critical thinking and problem solving skills essential for success in the classroom and beyond.

Our faculty members are highly skilled in the use of technology in teaching to ensure that our graduates are well prepared to be leaders in the 21st century. Students participate in co-operative learning activities based on realistic problems and scenarios and learn from extensive practical experiences.

The Faculty of Education offers three program choices to its students in education. The Consecutive Education programs are one-year, post-degree programs that prepare graduates to teach at either the Primary/Junior (Kindergarten to Grade 6) or Intermediate/Senior (Grade 7 to 12) level. The Concurrent Education program enables students to pursue a Bachelor of Science degree while also completing a Bachelor of Education (Intermediate/Senior) degree.

The laptop is integral to our programs and students use information technology in a variety of ways to enhance their learning experience. Students benefit from support through the university's mobile learning environment.

The faculty's education-based research is primarily focused on improving education, using educational technology and includes topics such as online learning, digital storytelling, learning objects, video case studies, instructional design and mini-clips.

10.2 Program information – Bachelor of Education (Consecutive)

10.2.1 General information

The Faculty of Education offers a one-year consecutive program in the preparation of Primary-Junior (P/J) and Intermediate-Senior (I/S) teachers. The emphasis on technology in learning and teaching is a defining element of UOIT's Bachelor of Education program. Teacher candidates use technology in their own learning experiences so that they will understand how to integrate technology into classroom practice. Courses use inquiry and problem-solving approaches with a focus on the importance of subject matter as the catalyst for teacher-learner interaction, as well as individual learning and teaching in shaping learning conditions.

10.2.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Selection of candidates is based on the following combination of academic criteria, experience and references:

10.2.2.1 Primary/Junior (P/J) program

Applicants will hold an undergraduate degree from a recognized university, with a minimum required average of 70 per cent (B- or 2.7 GPA) in their best 10 full-year or best 20 half-year courses completed. Preference will be given to students with four-year honours degrees.

Because Primary/Junior teachers deal with a wide range of subject areas, it is desirable that applicants have a broad academic background. In assessing the academic breadth of Primary/Junior applicants, the Faculty of Education gives preference to candidates who have one or more 3 credit hour undergraduate or graduate courses in the subject groupings listed below:

- English/Linguistics/Languages;
- Mathematics/Statistics;
- Physical Sciences/Life Sciences;
- Social Sciences/Humanities; and
- Visual Arts/Music/Drama.

Clearly, very few applicants will have coursework in all of the above areas; however, we consider that the more areas an applicant has covered, the stronger the application. Each candidate must have received the required undergraduate degree by July 1 of the year in which they begin their BEd program.

The application service (through Ontario Universities' Application Centre – OUAC) opens mid-September each year for Professional Program Applications to the Teacher Education Application Service (TEAS) and closes in late November/early December of each year. A complete application includes:

1. Transcripts – Applicants must ensure that any courses in progress are listed on the OUAC/TEAS application form, especially when appropriate prerequisites do not appear on the official transcripts being forwarded.

2. A supplementary application, consisting of:

- A personal profile outlining skills and related work experience; and
- Letters of reference.

3. Evidence of oral and written proficiency in English.

Successful applicants will be invited to an interview. A clear criminal record check and a Tuberculin (TB) test are post-admission requirements for all successful applicants.

10.2.2.2 Intermediate/Senior (I/S) program

Applicants will hold an undergraduate degree from a recognized university, with a minimum required average of 70 per cent (B- or 2.7 GPA) in their best 10 full-year or best 20 half-year courses completed.

Preference will be given to students with four-year honours degrees. Each candidate must have received the required undergraduate degree by July 1 of the year in which they begin their BEd program.

- Applicants must have completed a minimum of 30 credit hours in university courses (equivalent to five full courses, or 10 one-semester courses) in a first teachable subject and 18 credit hours (equivalent to three full courses, or six one-semester courses) in a second teachable subject; and
- A minimum of 70 per cent (B- or 2.7 GPA) is required with a minimum 70 per cent (B- or 2.7 GPA) average in courses applicable to each teachable subject.

The application service (through Ontario Universities' Application Centre – OUAC) opens mid-September of each year for Professional Program Applications to the Teacher Education Application Service (TEAS) and closes in late November/early December of each year. A complete application includes:

1. Transcripts – Applicants must ensure that any courses in progress are listed on the OUAC/TEAS application form, especially when appropriate prerequisites do not appear on the official transcripts being forwarded.

2. A supplementary application, consisting of:

- A personal profile outlining skills and related work experience; and
- Letters of reference.

3. Evidence of oral and written proficiency in English.

Successful applicants will be invited to an interview. A clear criminal record check and a Tuberculin (TB) test are post-admission requirements for all successful applicants.

10.2.3 Field experience

Students will be required to complete a minimum of 60 days of practice teaching in local elementary and secondary schools. For selected teacher candidates, an international placement option is available as a component to EDUC 4911U (P/J Field Experience and Practica II) or EDUC 4901U (I/S Field Experience and Practica II). For the last placement, after completing 15 days in Ontario, selected teacher candidates will have the option of completing an additional 20 days in a school outside of Canada.

10.2.4 Careers

Graduates are prepared to teach provincially, nationally and internationally. The emphasis on technology-enhanced teaching and learning also provides some graduates with career opportunities in college-level teaching or in training and professional development in corporate settings.

10.2.5 Teacher certification

The university's Bachelor of Education (Consecutive) programs are designed to meet all Ontario legislated requirements and incorporate the Standards of Practice and Ethical Standards for the Teaching Profession of the Ontario College of Teachers.

Graduates will be recommended by the university to the Ontario College of Teachers for certification to practice in the Ontario education system.

10.2.6 Degree requirements

To be eligible for the BEd degree, students must successfully complete the courses outlined below. Students must achieve a minimum overall average of 70 per cent (B- or 2.7 GPA) to be eligible for promotion in and graduation from the Bachelor of Education (Consecutive) degree program. For course descriptions, see Section 16.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings please visit the faculty website at **www.education.uoit.ca**.

PRIMARY/JUNIOR PROGRAM

The degree requirements for the Bachelor of Education Primary/Junior program is comprised of 34.5 credit hours, including 33 credit hours of required courses and 1.5 credit hours of elective courses.

a) Major requirements: 33 credit hours, including:
CURS 4200U P/J Core Curriculum Methods
CURS 4210U P/J Language Arts I
CURS 4211U P/J Language Arts II
CURS 4240U P/J Mathematics I
CURS 4241U P/J Mathematics II
CURS 4251U P/J Visual Arts, Music and Dance
CURS 4271U P/J Social Studies
CURS 4280U P/J Science and Technology I
CURS 4281U P/J Science and Technology II
CURS 4291U P/J Health and Physical Education
EDUC 3510U P/J Learning with ICT
EDUC 3610U P/J Contemporary Educational Practice
EDUC 3750U P/J Learning and Child Development
EDUC 3800U P/J Individual Needs and Diversity
EDUC 4380U P/J Analysis and Management of Classroom Behaviour
EDUC 4910U P/J Field Experience and Practica I
EDUC 4911U P/J Field Experience and Practica II+
Education electives*

b) Elective requirements: 1.5 credit hours selected from the following list:
Note: Not all listed electives will be available every year.

EDUC 3430U Dramatic Arts
EDUC 3440U Teaching of Students of English as a Second Language
EDUC 3441U L'apprentissage en français
EDUC 3450U Teaching Kindergarten
EDUC 3452U Teacher as Coach
EDUC 3455U Mental Health
EDUC 3460U Problem-Based Learning
EDUC 3470U Issues in Education
EDUC 3480U Outdoor Education: Canoe Tripping
EDUC 3481U Outdoor Education: Backpacking
EDUC 3482U Outdoor Education: Winter Survival with Cross Country Skiing
EDUC 3483U Outdoor Education: Bush Snowshoeing and Tenting
EDUC 3490U Geographic Information Systems
EDUC 3560U Religious Education: Teaching in Ontario Catholic Schools
EDUC 4611U Planning for Learning with Technology
EDUC 4612U Technology for Teachers
EDUC 4620U Teaching Extended Mathematics
EDUC 4622U Mathematics for Teachers

+**Note:** For selected teacher candidates, an international placement option is available as a component of EDUC 4911U. After completing 15 days in Ontario, selected teacher candidates will have the option of completing an additional 20 days in a school outside of Canada.

INTERMEDIATE/SENIOR PROGRAM

The degree requirements for the Bachelor of Education Intermediate/Senior program is comprised of 35.25 credit hours, including 33.75 credit hours of required courses and 1.5 hours of elective courses.

a) Major requirements: 33.75 credit hours, including:
CURS 4000U I/S Core Curriculum Methods I
CURS 4001U I/S Core Curriculum Methods II
CURS – Curriculum Studies I*
CURS – Curriculum Studies I*
CURS – Curriculum Studies II*
CURS – Curriculum Studies II*
EDUC 3511U I/S Learning with ICT
EDUC 3611U I/S Contemporary Educational Practice
EDUC 3751U I/S Learning and Adolescent Development
EDUC 3801U I/S Individual Needs and Diversity
EDUC 3911U I/S Information Literacy
EDUC 4381U I/S Analysis and Management of Classroom Behaviour I
EDUC 4382U I/S Analysis and Management of Classroom Behaviour II
EDUC 4900U I/S Field Experience and Practica I
EDUC 4901U I/S Field Experience and Practica II+

***Curriculum Studies**
Students will complete two curriculum studies courses in each of semesters one and two. Students must take one course per term in each of the teachable subject areas under which they were admitted.

CURS 4100U and CURS 4101U I/S Biology
CURS 4110U and CURS 4111U I/S English
CURS 4120U and CURS 4121U I/S Chemistry
CURS 4130U and CURS 4131U I/S Physics
CURS 4140U and CURS 4141U I/S Mathematics
CURS 4150U and CURS 4151U I/S Visual Arts
CURS 4160U and CURS 4161U I/S Computer Studies
CURS 4180U and CURS 4181U I/S General Science
CURS 4190U and CURS 4191U I/S Geography
CURS 4501U and CURS 4502U I/S History
CURS 4503U and CURS 4504U I/S Health and Physical Education

b) Elective requirements: 1.5 credit hours selected from the following list:
Note: Not all listed electives will be available every year.

EDUC 3430U Dramatic Arts
EDUC 3440U Teaching of Students of English as a Second Language
EDUC 3441U L'apprentissage en français
EDUC 3450U Teaching Kindergarten
EDUC 3452U Teacher as Coach
EDUC 3455U Mental Health
EDUC 3460U Problem-Based Learning
EDUC 3470U Issues in Education
EDUC 3480U Outdoor Education: Canoe Tripping
EDUC 3481U Outdoor Education: Backpacking
EDUC 3482U Outdoor Education: Winter Survival with Cross Country Skiing
EDUC 3483U Outdoor Education: Bush Snowshoeing and Tenting
EDUC 3490U Geographic Information Systems
EDUC 3560U Religious Education: Teaching in Ontario Catholic Schools
EDUC 4611U Planning for Learning with Technology
EDUC 4612U Technology for Teachers
EDUC 4620U Teaching Extended Mathematics
EDUC 4622U Mathematics for Teachers

+**Note:** For selected teacher candidates, an international placement option is available as a component of EDUC 4901U. After completing 15 days in Ontario, selected teacher candidates will have the option of completing an additional 20 days in a school outside of Canada.

10.3 Program information – Concurrent Education

Bachelor of Science (Honours)/Bachelor of Education (Intermediate/Senior) – BSc (Hons)/BEd

10.3.1 General information

In co-operation with the Faculty of Science, a Concurrent Education program is offered whereby candidates complete education courses concurrently with their science courses. Students will complete all the required coursework for an Honours BSc degree and must take a minimum of 10 courses in their first teachable subject and six courses in their second teachable subject. The teachable subjects offered in the Concurrent Education program are:

- Biology;
- Chemistry;
- Computer Studies;
- Mathematics; and
- Physics.

To continue to the fifth year of the Concurrent Education program, students must have an overall minimum average of 70 per cent (B- or 2.7 GPA) based on an average of their best 20 half-year courses, in addition to a minimum average of 70 per cent (B- or 2.7 GPA) on the 10 courses in the first teachable subject and on the six courses in the second teachable subject.

Students will receive a BSc (Hons) degree upon successful completion of a four-year program of study. Students will receive a BEd degree upon successful completion of a five-year program of study.

The Faculty of Education's Concurrent Education program prepares students to teach in the areas of science, mathematics or computer science. The emphasis on technology in learning and teaching is a defining element of the Concurrent Education programs. Students use technology in both their science and education classes so that they will understand how to integrate technology into classroom practice.

Co-operative learning activities based on realistic problems and scenarios prepare candidates for situations which they will likely encounter in their field experiences and their own classrooms upon graduation. There is a specific focus on the rigorous Ontario mathematics and science curriculum.

Graduates of these programs will be prepared to teach in the Intermediate/Senior (I/S) divisions (Grades 7-12) of Ontario schools.

10.3.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with a minimum overall average of 75 per cent on six 4U or 4M credits including English (ENG4U), Advanced Functions (MHF4U), and two of Biology (SBI4U), Chemistry (SCH4U), Physics (SPH4U), or Calculus and Vectors (MCV4U). In addition, a combined minimum 75 per cent average in mathematics and science courses is required. It is recommended that all four MCV4U, SBI4U, SCH4U and SPH4U be taken. All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

A clear criminal record check and a Tuberculin (TB) test are post-admission requirements.

10.3.3 Field experience

Students will be required to complete a minimum of 100 days of practice teaching in local elementary and secondary schools. For selected teacher candidates, an international placement option is available as a component to EDUC 4901U (I/S Field Experience and Practica). For the last placement, after completing 15 days in Ontario, selected teacher candidates will have the option of completing an additional 20 days in a school outside of Canada.

10.3.4 Careers

Graduates are prepared to teach provincially, nationally and internationally. The emphasis on technology-enhanced teaching and learning may also provide graduates with career opportunities in college-level teaching or in training and professional development in corporate settings.

10.3.5 Teacher certification

The university's Bachelor of Education Concurrent program is designed to meet all Ontario legislated requirements and incorporates the Standards of Practice and Ethical Standards for the Teaching Profession of the Ontario College of Teachers. Graduates will be recommended by the university to the Ontario College of Teachers for certification to practice in the Ontario education system.

10.3.6 Degree requirements – Bachelor of Science (Honours)/Bachelor of Education

Teachable combinations include:

- Applied and Industrial Mathematics major – Mathematics first teachable/Biology second teachable;
- Applied and Industrial Mathematics major – Mathematics first teachable/Chemistry second teachable;
- Applied and Industrial Mathematics major – Mathematics first teachable/Computer Studies second teachable;
- Applied and Industrial Mathematics major – Mathematics first teachable/Physics second teachable;
- Biological Science major – Biology first teachable/Chemistry second teachable;
- Biological Science major – Biology first teachable/Computer Studies second teachable;
- Biological Science major – Biology first teachable/Mathematics second teachable;
- Biological Science major – Biology first teachable/Physics second teachable;
- Chemistry major – Chemistry first teachable/Biology second teachable;
- Chemistry major – Chemistry first teachable/Computer Studies second teachable;
- Chemistry major – Chemistry first teachable/Mathematics second teachable;
- Chemistry major – Chemistry first teachable/Physics second teachable;
- Computing Science major – Computer Studies first teachable;
- Physics major – Physics first teachable/Biology second teachable;
- Physics major – Physics first teachable/Chemistry second teachable;
- Physics major – Physics first teachable/Computer Studies second teachable; and
- Physics major – Physics first teachable/Mathematics second teachable.

Year 1

EDUC 2900U Introduction to Teaching and Field Experience I (10 days)

Year 2

EDUC 2901U Field Experience II (15 days)
EDUC 3752U Learning and Human Development

Year 3

EDUC 4902U Field Experience III (Practicum) (20 days)
EDUC 3612U Contemporary Educational Practice

Year 4

No courses

Year 5

The degree requirements for the Bachelor of Science (Honours)/Bachelor of Education Intermediate/Senior program is comprised of 35.25 credit hours, including 30.75 credit hours of required courses and 4.5 credit hours of elective courses.

a) Major requirements: 30.75 credit hours, including:
CURS 4000U I/S Core Curriculum Methods I
CURS 4001U Core Curriculum Methods II
CURS – Curriculum Studies I *
CURS – Curriculum Studies I *
CURS – Curriculum Studies II *
CURS – Curriculum Studies II *
EDUC 3511U I/S Learning with ICT
EDUC 3801U I/S Individual Needs and Diversity
EDUC 3911U I/S Information Literacy
EDUC 4381U I/S Analysis and Management of Classroom Behaviour I
EDUC 4382U I/S Analysis and Management of Classroom Behaviour II
EDUC 4900U I/S Field Experience and Practica I
EDUC 4901U I/S Field Experience and Practica II+

***Curriculum Studies**
Students will complete two curriculum studies courses in each of semesters one and two. Students must take one course per term in each of the teachable subject areas under which they were admitted.

CURS 4100U and CURS 4101U I/S Biology
CURS 4110U and CURS 4111U I/S English
CURS 4120U and CURS 4121U I/S Chemistry
CURS 4130U and CURS 4131U I/S Physics
CURS 4140U and CURS 4141U I/S Mathematics
CURS 4150U and CURS 4151U I/S Visual Arts
CURS 4160U and CURS 4161U I/S Computer Studies
CURS 4180U and CURS 4181U I/S General Science
CURS 4190U and CURS 4191U I/S Geography
CURS 4501U and CURS 4502U I/S History
CURS 4503U and CURS 4504U I/S Health and Physical Education

b) Elective requirements: 4.5 credit hours selected from the following list:
Students in the Intermediate/Senior Concurrent program must take at least three education electives.
Note: Not all listed electives will be available every year.

EDUC 3430U Dramatic Arts
EDUC 3440U Teaching of Students of English as a Second Language
EDUC 3441U L'apprentissage en français
EDUC 3450U Teaching Kindergarten
EDUC 3452U Teacher as Coach
EDUC 3455U Mental Health
EDUC 3460U Problem-Based Learning
EDUC 3470U Issues in Education
EDUC 3480U Outdoor Education: Canoe Tripping
EDUC 3481U Outdoor Education: Backpacking
EDUC 3482U Outdoor Education: Winter Survival with Cross Country Skiing
EDUC 3483U Outdoor Education: Bush Snowshoeing and Tenting
EDUC 3490U Geographic Information Systems
EDUC 3560U Religious Education: Teaching in Ontario Catholic Schools
EDUC 4611U Planning for Learning with Technology
EDUC 4612U Technology for Teachers
EDUC 4620U Teaching Extended Mathematics
EDUC 4622U Mathematics for Teachers

****Note:** For selected teacher candidates, an international placement option is available as a component of EDUC 2911U. After completing 15 days in Ontario, selected teacher candidates will have the option of completing an additional 20 days in a school outside of Canada.

SECTION 11:
FACULTY OF ENERGY SYSTEMS AND NUCLEAR SCIENCE

Dean: George Bereznai, BE (Hons), MEng, PhD, PEng

Program directors:

Nuclear Engineering and Energy Systems Engineering – Glenn Harvel, BEng, MEng, PhD, PEng

Health Physics and Radiation Science – Anthony Waker, BSc (Hons), PhD

Graduate programs – Igor Pioro, MASc (Hons), PhD, Dr Tech Sc, PEng

Professors:

George Bereznai, BE (Hons), MEng, PhD, PEng

Anthony Waker, BSc (Hons), PhD

Edward Waller, BSc, MScE, PhD, PEng

Associate professors:

Hossam Gabbar, BSc (Hons), PhD, PEng

Glenn Harvel, BEng, MEng, PhD, PEng

Brian Ikeda, BSc (Hons), MSc, PhD

Eleodor Nichita, BSc, MSc, PhD, PEng

Igor Pioro, MASc (Hons), PhD, Dr Tech Sc, PEng

Nuclear Engineer in Residence and associate professor:

John Froats, BEng, PEng

Assistant professors:

Matthew Kaye, BASc, MSc, PhD

Rachid Machrafi, BSc, MSc, PhD

Lixuan Lu, MSc, PhD, PEng
(Cross-appointment with the Faculty of Engineering and Applied Science)

Adjunct professors:

Jen-Shih Chang, PhD, Professor Emeritus

Daniel Meneley, BE, DIC, PhD, PEng, FCAE, FANS, FCNS

Benjamin Rouben, BSc, PhD

Adjunct associate professors:

Daniel Goodman, M.D., FRCPC

Daniel Hoornweg, BSc, MSc, PEng

Senior academic advisor:

Kerry Armstrong, BA (Hons), MEd

www.nuclear.uoit.ca

11.1 Degrees offered

Bachelor of Applied Science (Honours) in Nuclear Power – BASc (Hons)
(Students are not currently being admitted to this program.)

Bachelor of Applied Science (Honours) In Nuclear Power Bridge program - BASc (Hons)

Bachelor of Engineering (Honours) in Energy Systems Engineering – BEng (Hons)

Bachelor of Engineering (Honours) in Nuclear Engineering – BEng (Hons) Bachelor of Engineering and Management (Honours) – BEng and Mgt (Hons)

Bachelor of Science (Honours) in Health Physics and Radiation Science – BSc (Hons)

The programs offered in the Faculty of Energy Systems and Nuclear Science have been created in consultation with key industry representatives in the fields of energy and radiation, to meet the many challenges and growing employment demand in these fields. Many of the programs in this faculty are unique in Canada.

Applications that involve energy systems in general and nuclear power plants in particular, benefit many aspects of our lives. Society depends on qualified people to design and develop new techniques, operate and maintain existing equipment, and to ensure that the benefits of energy technologies are applied as widely as possible.

Students will benefit from the university's mobile learning environment (Section 1.2) which provides technically enhanced learning and teaching, including computer simulation of nuclear, fossil and alternative energy plants.

The faculty's research includes nuclear reactor design and safety analysis, nuclear power plant design and simulation, safety-critical digital instrumentation and control systems, reliability engineering, human machine interface and uncertainty analysis, radiation biophysics, dosimetry and microdosimetry, environmental effects of radiation, health and medical physics, radioactive waste management, electrochemical and corrosion effects.

The Faculty of Energy Systems and Nuclear Science offers Master of Applied Science (MASc) and Master of Engineering (MEng) programs in Nuclear Engineering, graduate diploma programs, and a PhD in Nuclear Engineering. Further information about graduate studies at UOIT is available at **www.gradstudies.uoit.ca**.

11.2 Program information – Bachelor of Applied Science (Honours) in Nuclear Power – BASc (Hons)

(Students are not currently being admitted to this program.)

11.2.1 General information

UOIT designed the Bachelor of Applied Science (Honours) in Nuclear Power to meet a significant demand in the nuclear power industry for graduates with strong practical experience, technical knowledge and management skills. The curriculum provides students with an understanding of the principles and applications of nuclear power technology, the ability to think independently, to take a systematic approach to problem solving, and to develop skills in teamwork and collaboration.

11.2.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a minimum average of 60 per cent, Advanced Functions (MHF4U), Calculus and Vectors (MCV4U), Chemistry (SCH4U), and Physics (SPH4U). In addition, a combined minimum 70 per cent average in math and science courses is required, with no grade below 60 per cent. All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

11.2.3 Careers

Graduates will find employment and progress to positions of increasing responsibility in a range of technology-based companies and institutions, with a particular emphasis in energy systems and nuclear power related specialties.

11.2.4 Degree requirements

To be eligible for the BASc (Hons) degree in Nuclear Power, students must successfully complete 120 credit hours, including all courses outlined in the following program map. For course descriptions, see Section 16.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.nuclear.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
ENGR 1250U Engineering Graphics
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (15 credit hours)
CHEM 1800U Chemistry for Engineers
ENVS 1000U Environmental Science
MATH 1020U Calculus II
NUCL 1530U Radiation and Nuclear Technologies
PHY 1020U Physics II

YEAR 2

Semester 1 (15 credit hours)
ENGR 1200U Introduction to Programming
ENGR 2500U Introduction to Nuclear Physics
ENGR 2790U Electric Circuits
MATH 2860U Differential Equations for Engineers
NUCL 2220U Radiation Effects on Material Properties

Semester 2 (15 credit hours)
BUSI 2000U Collaborative Leadership
ENGR 2360U Electric Power Systems
ENGR 2640U Thermodynamics and Heat Transfer
ENGR 2950U Radiation Protection
ENGR 3820U Nuclear Reactor Kinetics

YEAR 3

Semester 1 (15 credit hours)
BUSI 2311U Organizational Behaviour
ENGR 2860U Fluid Mechanics
NUCL 4360U Nuclear Plant Electric and Auxiliary Systems
NUCL 4620U Radioactive Waste Management
ENGR 4640U Nuclear Plant Operation

Semester 2 (15 credit hours)
ENGR 2330U Mechanical Equipment and Systems
NUCL 43540U Nuclear Steam Supply Systems
ENGR 4730U Reactor Control
Complementary Studies elective*
Technical elective*

YEAR 4

Semester 1 (15 credit hours)
NUCL 4550U Thesis Project I
NUCL 4545U Nuclear Plant Steam Utilization Systems
Complementary Studies elective*
Complementary Studies elective*
Technical elective*

Semester 2 (15 credit hours)
NUCL 4520U Nuclear Plant Safety
NUCL 4560U Thesis Project II
ENGR 4810U Nuclear Fuel Cycles
ENGR 3360U Engineering Economics
Technical elective*

11.3 Program information – Bachelor of Applied Science (Honours) In Nuclear Power Bridge program - BASc (Hons)

11.3.1 General information

UOIT designed the Bridge program to a Bachelor of Applied Science (Honours) in Nuclear Power to meet a significant demand in the nuclear power industry for graduates with strong practical experience, technical knowledge and management skills. The curriculum provides college students with an understanding of the principles and applications of nuclear power technology, the ability to think independently, to take a systematic approach to problem solving, and to develop skills in teamwork and collaboration.

UOIT's Nuclear Power Bridge program provides college students with the opportunity to apply their three-year diploma from an Engineering Technology program toward a Bachelor of Applied Science in Nuclear Power (Honours) degree.

11.3.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Graduates from a three-year Ontario College Advanced diploma (or equivalent) in one of the following programs: Chemical Engineering Technologist, Computer Engineering Technologist, Electrical Engineering Technologist, Electromechanical Engineering Technologist, Electronics Engineering Technologist, Manufacturing Engineering Technologist or Mechanical Engineering Technologist diploma, with an overall B- average, 70% or 2.7 GPA on a 4.3 scale or better, will be considered for admission to UOIT's Nuclear Power Bridge program. Graduates of two- or three-year Ontario College programs in other disciplines should contact UOIT to determine their admission eligibility for this program.

11.3.3 Careers

The Bridge program in Nuclear Power was developed in response to requests from people in the nuclear industry to upgrade and update their education. Such people typically work in functions related to operation and maintenance, and do not have design responsibilities. The BASc program content meets the educational requirements of such jobs by including much of the science and technical content of a nuclear engineering program excluding design. As such, bridging into the Nuclear Power program will lead to employment at nuclear facilities in positions such as Operator, Field Operator, Engineering Support, procurement, field modifications, system monitoring, and planning.

11.3.4 Degree requirements

Students who successfully complete all five bridge courses with a cumulative C average (60 per cent or 2.0 on a 4.3 scale or better), will be eligible for admission to the third year of UOIT's four-year Bachelor of Applied Science in Nuclear Power (Honours) degree*. Students in the BASc Bridge program in Nuclear Power must successfully complete 87 credit hours, including all courses outlined in the following program map. For course descriptions, see Section 16.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.nuclear.uoit.ca**.

Summer Bridge requirements*

Spring (9 credit hours)
ENGR 0101U Mathematics Foundation for Engineers I
ENGR 0102U Mathematics Foundation for Engineers II
ENGR 0105U Physics Foundation for Engineers

Summer (6 credit hours)
ENGR 0103U Mathematics Foundation for Engineers III
ENGR 0107U Fluid Mechanics and Thermodynamics

*The Nuclear Power Bridge program includes the five required courses above. A sixth course may be required based on your college degree. Please consult your program director to determine whether you require a sixth course.

YEAR 3

Semester 1 (18 credit hours)
BUSI 2000U Collaborative Leadership
ENGR 2500U Introduction to Nuclear Physics
ENGR 2790U Electric Circuits
NUCL 1530U Radiation and Nuclear Technologies
NUCL 2220U Radiation Effects on Material Properties
Complementary Studies elective*

Semester 2 (18 credit hours)
ENGR 2330U Mechanical Equipment and Systems
CHEM 1800U Chemistry for Engineers
ENGR 2360U Electric Power Systems
ENGR 2950U Radiation Protection
ENGR 3820U Nuclear Reactor Kinetics
ENVS 1000U Environmental Science

YEAR 4

Semester 1 (18 credit hours)
BUSI 2311U Organizational Behaviour
ENGR 4640U Nuclear Plant Operation
NUCL 4360U Nuclear Plant Electric and Auxiliary Systems
NUCL 4540U Nuclear Steam Supply Systems
NUCL 4550U Thesis Project I
NUCL 4620U Radioactive Waste Management

Semester 2 (18 credit hours)
ENGR 3360U Engineering Economics
NUCL 4520U Nuclear Plant Safety
NUCL 4545U Nuclear Plant Steam Utilization Systems
NUCL 4560U Thesis Project II
ENGR 4730U Reactor Control
ENGR 4810U Nuclear Fuel Cycles

11.4 Program information – Bachelor of Engineering (Honours) in Energy Systems Engineering – BEng (Hons)

11.4.1 General information

Students in the Honours Bachelor of Engineering in Energy Systems Engineering program will learn the skills to design and develop tomorrow's energy systems. This degree program is the first stand-alone program of its kind in Canada. The program was developed to meet the rapidly increasing demand for graduates with the knowledge and skills required to help Canada and the rest of the world meet the terms of the Kyoto agreement, while ensuring that the growing consumption of energy can be satisfied economically and with minimum impact on the environment.

The curriculum provides students with an understanding of the principles and applications of the full range of energy systems and technologies from traditional fossil-fuelled energy systems to alternative energy technologies. This includes the production, storage, distribution and utilization of energy.

11.4.2 Admission requirements

See Section 11.2.2.

11.4.3 Work placement/internship opportunities

Optional work placement opportunities will be available. A 12-16 month optional internship program is also available for students completing the second or third year of the program.

11.4.4 Careers

Graduates will be well prepared to work with systems that involve the generation, transmission or utilization of energy. Career opportunities are increasing for graduates in industry, government and non-government organizations. Graduates may also choose to start their own energy enterprise or pursue graduate studies.

11.4.5 Professional designation

This program was developed to meet the requirements of the Canadian Engineering Accreditation Board. Graduates will be eligible to apply for licensure as a professional engineer in any Canadian province or territory.

11.4.6 Degree requirements

To be eligible for the BEng (Hons) degree in Energy Systems Engineering, students must successfully complete 135 credit hours, including all courses outlined in the following program map. For course descriptions, see Section 16.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.nuclear.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
ENGR 3200U Engineering Graphics and Design
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)
CHEM 1800U Chemistry for Engineers
ENGR 1200U Introduction to Programming
ENVS 1000U Environmental Science
MATH 1020U Calculus II
NUCL 1530U Radiation and Nuclear Technologies
PHY 1020U Physics II

YEAR 2

Semester 1 (18 credit hours)
ENGR 2140U Problem Solving, Modelling and Simulation
ENGR 2220U Structure and Properties of Materials
ENGR 2790U Electric Circuits
ENGR 2860U Fluid Mechanics
MATH 2860U Differential Equations for Engineers
Complementary Studies elective*

Semester 2 (18 credit hours)
ENGR 2010U Thermodynamic Cycles
ENGR 2360U Electric Power Systems
ENGR 3380U Strength of Materials
MATH 2810U Advanced Engineering Mathematics or
  MATH 2070U Numerical Methods
SSCI 1470U Impact of Science and Technology on Society
STAT 2800U Statistics and Probability for Engineers

YEAR 3

Semester 1 (15 credit hours)
ENGR 3260U Introduction to Energy Systems
ENGR 3280U Fundamentals of Computer-Aided Design Tools
ENGR 3350U Control Systems
ENGR 3930U Heat Transfer
Liberal Studies elective*

Semester 2 (18 credit hours)
ENGR 2330U Mechanical Equipment and Systems
ENGR 3360U Engineering Economics+
ENGR 3730U Solar Energy Technologies
ENGR 3830U Wind Energy Systems
ENGR 3840U Fuel Cell Design
Engineering Science elective*

+Students in an Engineering and Management program take BUSI 1700U Introduction to Entrepreneurship in place of ENGR 3360U Engineering Economics.

YEAR 4

Semester 1 (18 credit hours)
BUSI 3700U Strategic Management for Professionals
ENGR 4410U Fossil Fuel Energy Conversion
ENGR 4470U Hydrogen Power Systems
ENGR 4660U Risk Analysis Methods
ENGR 4994U Thesis Design Project I
Complementary Studies elective*

Semester 2 (15 credit hours)
ENGR 4460U Nuclear Power Systems
ENGR 4480U Emerging Energy Systems
ENGR 4530U Hydroelectric Power
ENGR 4760U Ethics, Law and Professionalism for Engineers
ENGR 4998U Thesis Design Project II

11.5 Program information – Bachelor of Engineering (Honours) in Nuclear Engineering – BEng (Hons)

11.5.1 General information

The four-year honours Bachelor of Engineering in Nuclear Engineering program was designed to meet a worldwide need for graduates in the field of nuclear engineering.

Although the primary focus of the program is nuclear power plant engineering, the curriculum is sufficiently broad-based that graduates will be well qualified for careers in many applications of nuclear technology and energy related fields.

The first two years of study provide students with a solid foundation in the fundamentals of mathematics and sciences, with years three and four concentrating on engineering sciences and specific nuclear engineering courses.

Students who choose Nuclear Engineering and Management take two semesters of business and management courses after successfully completing third year. The regular fourth year of the engineering program is then taken in year five of the program.

Learning takes place in a variety of settings including lectures, tutorials, field visits, laboratories and via computer simulation – the most extensive computer simulation of nuclear power plants of any engineering program in Ontario.

Electives may be taken from other programs in the engineering and science faculties, health physics and radiation science, and liberal arts, with complementary studies in collaborative leadership, economics, ethics and law, and strategic management. Students develop management, interpersonal, problem-solving, and holistic thinking skills while gaining a comprehensive knowledge of nuclear engineering science and design, as well as the latest developments in this field.

11.5.2 Admission requirements

See Section 11.2.2.

11.5.3 Work placement/internship opportunities

The university's proximity to the Pickering and Darlington nuclear power plants and a large number of diverse nuclear service companies provide many opportunities for work placements. In addition, a 12- to 16-month optional internship program is available for students completing the second or third year of the program.

11.5.4 Careers

There is a severe shortage of graduates to replace retiring engineers in the nuclear field. This program prepares graduates who are technically skilled engineers and who can undertake research, development, design, safety, licensing, maintenance, operation and decommissioning of nuclear power plants and related facilities.

Potential employers include utilities, service companies, government agencies, and research and design institutions, both in Canada and abroad. Major Canadian utilities and engineering companies that design, operate and service nuclear power plants are looking for a reliable supply of nuclear engineers.

11.5.5 Professional designation

See Section 11.4.5.

11.5.6 Degree requirements

To be eligible for the BEng (Hons) degree in Nuclear Engineering, students must successfully complete 144 credit hours, including all courses outlined in the following program map. For course descriptions, see Section 16.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.nuclear.uoit.ca**.

YEAR 1

Semester 1 (18 credit hours)
COMM 1050U Technical Communications
ENGR 3200U Engineering Graphics and Design
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I
Liberal Studies elective*

Semester 2 (18 credit hours)
BIOL 1840U Biology for Engineers or
    ENVS 1000U Environmental Science
CHEM 1800U Chemistry for Engineers
ENGR 1200U Introduction to Programming
MATH 1020U Calculus II
NUCL 1530U Radiation and Nuclear Technologies
PHY 1020U Physics II

YEAR 2

Semester 1 (18 credit hours)
ENGR 2140U Problem Solving, Modelling and Simulation
ENGR 2220U Structure and Properties of Materials
ENGR 2500U Introduction to Nuclear Physics
ENGR 2790U Electric Circuits
ENGR 2860U Fluid Mechanics
MATH 2860U Differential Equations for Engineers

Semester 2 (18 credit hours)
SSCI 1470U Impact of Science and Technology on Society
ENGR 2010U Thermodynamic Cycles
ENGR 2950U Radiation Protection
ENGR 3820U Nuclear Reactor Kinetics
MATH 2070U Numerical Methods or
MATH 2810U Advanced Engineering Mathematics
STAT 2800U Statistics and Probability for Engineers

YEAR 3

Semester 1 (18 credit hours)
ENGR 3280U Fundamentals of Computer-Aided Design Tools
ENGR 3570U Environmental Effects of Radiation
ENGR 3740U Scientific Instrumentation
ENGR 3930U Heat Transfer
ENGR 4640U Nuclear Plant Operation
Complementary Studies elective*

Semester 2 (18 credit hours)
ENGR 3360U Engineering Economics+
ENGR 3380U Strength of Materials
ENGR 4610U Corrosion for Engineers
ENGR 4730U Reactor Control
ENGR 4780U Nuclear Reactor Design
Liberal Studies elective*

+Students in an Engineering and Management program take BUSI 1700U Introduction to Entrepreneurship in place of ENGR 3360U Engineering Economics.

YEAR 4

Semester 1 (18 credit hours)
BUSI 3700U Strategic Management for Professionals
ENGR 4620U Radioactive Waste Management Design
ENGR 4660U Risk Analysis Methods
ENGR 4700U Nuclear Plant Design and Simulation
ENGR 4994U Thesis Design Project I
Engineering Science elective*

Semester 2 (18 credit hours)
ENGR 4520U Nuclear Plant Safety Design
ENGR 4760U Ethics, Law and Professionalism for Engineers
ENGR 4810U Nuclear Fuel Cycles
ENGR 4998U Thesis Design Project II
Engineering Design elective*
Engineering Science elective*

***Electives**

Engineering courses from other engineering programs may be allowed as engineering electives, provided the students have the prerequisites and/or greater breadth in a complementary field. These courses must be approved by the Faculty of Energy Systems and Nuclear Science.

Engineering Design elective
ENGR 4670U Shielding Design

Engineering Science electives
Engineering science electives must be approved by the dean of the Faculty of Energy Systems and Nuclear Science or a designate. Please visit the faculty website to view the list of approved electives.

Complementary Studies electives
The dean of the faculty or a designate must approve courses selected for the complementary studies elective. Courses in the arts and humanities or business typically are allowable as a complementary elective.

Liberal Studies electives
The dean of the faculty or a designate must approve courses selected for the liberal studies electives.

Technical elective
The dean of the faculty or designate must approve courses selected for the technical elective.

11.6 Program information – Bachelor of Engineering and Management (Honours)

11.6.1 General information

The Engineering and Management combination program meets the rapidly increasing need for engineers with the leadership skills to succeed in business and management. Students study the complete engineering program, and also gain critical management skills in key areas of business including accounting, finance, operations, human resources and marketing.

Students in this program take two semesters of business and management courses for 30 credit hours after successfully completing third year. The regular fourth year of the engineering program is then taken in year five of the program. The two semesters of business and management courses may be taken in other years of the program with permission.

11.6.2 Admission requirements

See Section 11.2.2.

11.6.3 Work placement/internship/co-op opportunities

See Section 11.5.3.

11.6.4 Careers

Graduates of the Engineering and Management programs will be in high demand among employers in Ontario and beyond. With additional expertise in business and management, graduates of these programs will have a broader understanding of the business and management aspects of companies, allowing them to readily take on managerial roles or start their own businesses. Graduates may also choose to pursue further studies toward higher degrees. The courses in the business and management year may be creditable towards the course requirements of advanced degrees such as an MBA.

11.6.5 Professional designation

See Section 11.4.5.

11.6.6 Program details and degree requirements

Bachelor of Engineering and Management (Honours) – BEng and Mgt (Hons)

The Engineering and Management program follows the same program map as the four-year degree program for each option with two differences. First, in Year 3, Semester 2, students substitute ENGR 3360U Engineering Economics with BUSI 1700U Introduction to Entrepreneurship. Second, the program includes the addition of the following 10 courses in fourth year.

YEAR 4

Semester 1 (15 credit hours)
BUSI 1101U Financial Accounting
BUSI 2201U Marketing I
BUSI 2311U Organizational Behaviour
BUSI 2401U Finance I
ENGR 3160U Engineering Operations and Project Management

Semester 2 (15 credit hours)
BUSI 2170U Managerial Accounting
BUSI 2202U Marketing II
BUSI 2312U Introduction to Human Resources Management
BUSI 2402U Finance II
ENGR 3170U Engineering Production Management

YEAR 5

Students take the fourth year of the appropriate engineering program in year five.

The two semesters of business and management courses may be taken in other years of the program with permission.

11.7 Program information – Bachelor of Science (Honours) in Health Physics and Radiation Science – BSc (Hons)

11.7.1 General information

The four-year Honours Bachelor of Science in Health Physics and Radiation Science program provides an advanced science curriculum with a strong emphasis on safety aspects of ionizing radiations.

The curriculum is designed to provide students with a comprehensive knowledge of advanced science for radiation protection of humans and the environment, as well as the application of radiation technologies in health care and industry. The first two years establish the fundamentals in mathematics, physical and biological sciences and technology. In year three, students learn the fundamentals of radiation detection and measurement, imaging, radiation biophysics and how radiation is produced and used in a wide range of applications. Fourth year allows for specialization and includes two thesis projects.

Students in the Bachelor of Science (Honours) in Health Physics and Radiation Science receive specialized education in health physics. Health physics is a well-recognized branch of radiation science with a wide range of applications in many industries, such as nuclear power, non-destructive examinations, health care, agriculture, research, education, environmental protection, and the enforcement of government regulations.

Graduates from this program will be well positioned to meet a significant workforce demand. Learning takes place in a variety of settings including lectures, tutorials, field visits, and laboratories. These programs include mandatory liberal arts electives and business courses designed to develop students' interpersonal, problem-solving, and holistic thinking skills.

11.7.2 Admission requirements

See Section 11.2.2.

11.7.3 Work placement/internship opportunities

The university's proximity to the Pickering and Darlington nuclear power plants and a large number of diverse nuclear service companies provide many opportunities for work placements. Work terms will be facilitated with interested companies working in fields that are relevant to the student's career. In addition, a 12- to 16-month optional internship program is available for students completing the second or third year of the program.

11.7.4 Careers

There is a growing global demand for health physics and radiation science specialists. Graduates have many career opportunities, from research to nuclear power plants, as well as in healthcare, environmental protection and government regulation. Graduates can find careers in nuclear utilities, nuclear service companies, government agencies, natural resource industries and research institutions. Graduates will also have an excellent academic foundation if they wish to pursue further training for a career in hospitals and clinics.

11.7.5 Degree requirements

To be eligible for the BSc (Hons) in Health Physics and Radiation Science, students must successfully complete 132 credit hours including all courses outlined in the following program map. For course descriptions, see Section 16.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.nuclear.uoit.ca**.

YEAR 1

Semester 1 (18 credit hours)
CHEM 1010U Chemistry I
COMM 1050U Technical Communications
SSCI 1210U History of Science and Technology
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)
BIOL 1840U Biology for Engineers
CHEM 1020U Chemistry II
ENGR 1200U Introduction to Programming
MATH 1020U Calculus II
NUCL 1530U Radiation and Nuclear Technologies
PHY 1020U Physics II

YEAR 2

Semester 1 (18 credit hours)
BIOL 2840U Cell and Molecular Biology
CHEM 2020U Introduction to Organic Chemistry
ENGR 2140U Problem Solving, Modelling and Simulation
ENGR 2500U Introduction to Nuclear Physics
ENGR 2790U Electric Circuits
MATH 2860U Differential Equations for Engineers

Semester 2 (18 credit hours)
ENVS 1000U Environmental Science
MATH 2810U Advanced Engineering Mathematics or
    MATH 2070U Numerical Methods
RADI 2100U Radiological and Health Physics
RADI 2110U Health Physics Laboratory
SSCI 1470U Impact of Science and Technology on Society
STAT 2800U Statistics and Probability for Engineers

YEAR 3

Semester 1 (15 credit hours)
ENGR 3740U Scientific Instrumentation
ENGR 3860U Introduction to Nuclear Reactor Technology
HLSC 1200U Anatomy and Physiology I
RADI 3200U Medical Imaging
RADI 4550U Radiation Detection and Measurement

Semester 2 (15 credit hours)
ENGR 3360U Engineering Economics
RADI 4220U Radiation Biophysics and Dosimetry
RADI 4440U Radioisotopes and Radiation Machines
Complementary Studies elective*
Engineering or Science elective*

YEAR 4

Semester 1 (15 credit hours)
ENGR 3570U Environmental Effects of Radiation
ENGR 4660U Risk Analysis Methods
RADI 4430U Industrial Applications and Radiation Techniques
RADI 4995U Thesis Project I
Liberal Studies elective*

Semester 2 (15 credit hours)
RADI 4320U Therapeutic Applications of Radiation Techniques
RADI 4999U Thesis Project II
Senior Engineering or Science elective*
Senior Engineering or Science elective*
Liberal Studies elective*

***Electives**

Engineering or Science electives
Engineering or science electives and senior engineering or science electives must be approved by the dean of the Faculty of Energy Systems and Nuclear Science or a designate. Please visit the faculty website to view the list of approved electives.

Complementary Studies elective
The dean of the faculty or a designate must approve course selected for the complementary studies elective. Courses in the arts and humanities or business typically are allowable as a complementary elective.

Liberal Studies electives
The dean of the Faculty of Energy Systems Engineering and Nuclear Science or a designate must approve courses selected for the liberal studies electives.

11.8 First-year Engineering Transition Program

The objective of the First-year Engineering Transition Program is to provide first-year engineering students with an opportunity, before the start of second year, to complete first-year courses for which they have not obtained credit, to upgrade their grade point average and academic standing, and to improve their preparation for studies in subsequent years.

The program involves a second offering of demanding first-year courses, according to the following schedule:

Winter semester	Summer semester
MATH 1010U Calculus I	CHEM 1800U Chemistry for Engineers
PHY 1010U Physics I	ENGR 1200U Introduction to Programming
	ENGR 3200U Engineering Graphics and Design
	MATH 1020U Calculus II
	MATH 1850U Linear Algebra for Engineers
	PHY 1020U Physics II

At the end of the fall semester, engineering students who have failed or are missing Calculus I (MATH 1010U) or Physics I (PHY 1010U), are encouraged to take the course(s) during the winter semester. Students on academic warning will likely be required to take or repeat the courses which they have not already passed. The follow-up courses, Calculus II (MATH 1020U) and Physics II (PHY 1020U), along with the other above-noted first-year courses, will be offered during the summer semester.

Students who register in and successfully complete the transition program courses will have their academic standing re-evaluated. This re-evaluation will include all the grades received in transition program courses.

SECTION 12: FACULTY OF ENGINEERING AND APPLIED SCIENCE

Dean: George Bereznai, BE (Hons), MEng, PhD, PEng

Associate dean, accreditation, internship and co-op: Michael Bennett, BSc, MA, PhD, PEng, PMP

Associate dean, academic and research: Greg F. Naterer, BMath, MASc, PhD, PEng, FCSME, FASME, FEIC

Program directors:

Automotive, Manufacturing, Mechanical – Hossam Kishawy, BSc, MSc, PhD, PEng

Electrical, Computer, Software – Mikael Eklund, BSc (Eng), MSc (Eng), PhD, PEng, FASME

Professors:

Ibrahim Dincer, BSc, MSc, PhD, PEng, FWIF, FCSME

Ebrahim Esmailzadeh, BSc (Hons) (Eng), MPhil, PhD, PEng, CEng, FCSME, FASME, FIMechE, SMIEEE

Kamiel Gabriel, BSc, MSc, MBA, PhD, PEng

Hossam Kishawy, BSc, MSc, PhD, PEng, FAMSE

Richard J. Marceau, BEng, MScA, PhD, PEng, FCAE, SMIEEE

Greg F. Naterer, BMath, MASc, PhD, PEng, FCSME, FASME, FEIC

Bale Reddy, BTech, MTech, PhD

Marc A. Rosen, BASc, MASc, PhD, PEng, FCSME, FEIC, FASME, FIEF, FCAE

Associate professors:

Moustafa El-Gindy, BSc, MSc, PhD

Hossam Gabbar, BSc (Hon), PhD, PEng
(Cross-appointment with the Faculty of Energy Systems and Nuclear Science)

Ali Grami, BSc, MEng, PhD, PEng, SMIEEE

Ramiro Liscano, BScEng, MScEng, PhD, PEng, SMIEEE

Scott Nokleby, BEng, MASc, PhD, PEng

Remon Pop-Iliev, BSc, MASc, PhD, PEng

Ghaus M. Rizvi, BE, MS, MASc, PhD, PEng

Shahram ShahbazPanahi, BSc, MSc, PhD, PEng

Vijay Sood, BSc, MSc, PhD, PEng, FIEEE, FEIC

Dan Zhang, BASc, MASc, PhD, PEng, SMIEEE

Assistant professors:

Ahmad Barari, BSc, PhD, PEng

Min Dong, BEng, PhD

Mikael Eklund, BSc (Eng), MSc (Eng), PhD, PEng

Marnie Ham, BSc, MASc, PhD, PEng

Yuping He, BASc, MASc, PhD, PEng

Lixuan Lu, BES, MES, PhD, PEng
(Cross-appointment with the Faculty of Energy Systems and Nuclear Science)

Ruth Milman, BASc, MASc, PhD, PEng

Walid Morsi Ibrahim, BEng, MASc, PhD, PEng

Shahryar Rahnamayan, BSc, MSc, PhD, PEng

Jing Ren, BSc, MSc, PhD, PEng

Greg Rohrauer, DEC, BEng, PhD, PEng

Ying Wang, BEng, MASc, PhD, PEng

Ying Zhu, BSc, MSc, PhD
(Cross-appointment with the Faculty of Business and Information Technology)

Lecturers:

Michael Bennett, BSc, MA, PhD, PEng, PMP

Daniel Fischer, BASc, MASc, PhD, PEng, SMIEEE

Vinh Quan, BSc, MSc, PhD, PEng

Yuelei Yang, BEng, MSc, PhD

Senior academic advisor:

Joanna Campbell, BA, Cert Ed

Academic advising assistant:

Tammy Mulley, HSC, BSc, MA

www.engineering.uoit.ca

12.1 Degrees offered

Bachelor of Engineering (Honours) in Automotive Engineering – BEng (Hons)

Bachelor of Engineering (Honours) in Electrical Engineering – BEng (Hons)

Bachelor of Engineering (Honours) in Manufacturing Engineering – BEng (Hons)

Bachelor of Engineering (Honours) in Mechanical Engineering – BEng (Hons)

- Comprehensive Mechanical Engineering program;
- Energy Engineering option; and
- Mechatronics Engineering option.

Bachelor of Engineering (Honours) in Software Engineering – BEng (Hons)

Bachelor of Engineering and Management (Honours) in Automotive Engineering and Management – BEng and Mgt (Hons)

Bachelor of Engineering and Management (Honours) in Electrical Engineering and Management – BEng and Mgt (Hons)

Bachelor of Engineering and Management (Honours) in Manufacturing Engineering and Management – BEng and Mgt (Hons)

Bachelor of Engineering and Management (Honours) in Mechanical Engineering and Management – BEng and Mgt (Hons)

- Comprehensive Mechanical Engineering program;
- Energy Engineering option; and
- Mechatronics Engineering option.

Bachelor of Engineering and Management (Honours) in Software Engineering and Management – BEng and Mgt (Hons)

The Faculty of Engineering and Applied Science offers a wide array of engineering programs. Designed to meet the needs of industry, UOIT's engineering programs offer a solid grounding in basic sciences and mathematics, as well as applied courses such as robotics, mechatronics, solid mechanics, controls, computer-aided design, telecommunications, power systems, software design, electronics, and artificial intelligence.

Students have the opportunity to participate in an internship program to allow them to gain experiential learning by spending 12 to 16 months working in industry following third year. Students can also participate in two- to four-month co-op placements.

Each student benefits from the university's mobile learning environment (Section 1.2) on a campus equipped with state-of-the-art laboratories and fully networked classrooms.

Among the numerous teaching and research laboratories and facilities on campus are: OPG Engineering Building, with heavy and industrial-scale equipment and labs; the GM Automotive Centre of Excellence, a state-of-the-art automotive research facility including a full climate-controlled wind tunnel; and the Integrated Manufacturing Centre, an industrial-grade, flexible manufacturing facility with advanced manufacturing and automation technologies. To help meet industry's need for engineers with strong business skills, the Faculty of Engineering and Applied Science has developed several combination Engineering and Management programs. See Section 12.7 for more information.

A First-year Engineering Transition Program provides first-year engineering students, who need extra time to adapt to university, with an opportunity, before the start of second year, to complete first-year courses for which they have not obtained credit, to upgrade their grade point average and academic standing, and to improve their preparation for studies in subsequent years. See Section 12.9 for more information.

The faculty's research focuses on flexible and high-performance manufacturing, automotive engineering, energy, active control of vibration and sound, nonlinear dynamics and chaos, efficient and environmentally conscious engineering, robotics, mechatronics, computer-integrated manufacturing, micro-electromechanical systems, electronics, communication, and software engineering.

Doctor of Philosophy (PhD) programs are offered in Mechanical Engineering, and Electrical and Computer Engineering. Master of Applied Science (MASc) and Master of Engineering (MEng) programs are available in Mechanical Engineering, Automotive Engineering, and Electrical and Computer Engineering. For more information about UOIT graduate programs and opportunities, please refer to the graduate studies website at **www.gradstudies.uoit.ca**.

12.2 Program information – Bachelor of Engineering (Honours) in Automotive Engineering

12.2.1 General information

UOIT's Automotive Engineering program is unique in Canada. The automotive engineering curriculum provides an understanding of the principles and application of automotive engineering, while strengthening each student's ability to think independently and take a systematic approach to problem solving. Courses such as automotive systems design, vehicle dynamics and control, and automotive materials selection, prepare graduates for employment directly within the automotive industry, or within the many related automotive fields.

12.2.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a minimum average of 60 per cent, Advanced Functions (MHF4U), Calculus and Vectors (MCV4U), Chemistry (SCH4U), and Physics (SPH4U). In addition, a combined minimum 70 per cent average in math and science courses is required, with no grade below 60 per cent. All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

12.2.3 Work placement/internship/co-op opportunities

The university's proximity to some of the largest automotive and manufacturing companies in Canada provides many opportunities for work placements. In addition, a 12- to 16-month optional Engineering Internship Program is available for students completing third year, and students may participate in two- to four-month work placements through the Engineering Co-op Program. See course descriptions for ENGR 0998U Engineering Internship Program and ENGR 0999U Engineering Co-op Program for details (Section 16).

12.2.4 Careers

Graduates are prepared to work in automotive companies, as well as in many other industries that service the automotive sector and require specialized mechanical, electrical, automotive, software and manufacturing engineering skills. Automotive engineers may find employment at major automobile, truck, bus and motorcycle companies, as well as within racing teams, parts manufacturers and research and development organizations. Maintenance and repair are additional areas of employment for graduates. In addition, the program's mechanical engineering foundation provides graduates access to companies seeking mechanical engineers. Graduates may also choose to pursue further studies for higher degrees or start their own business.

12.2.5 Professional designation

All UOIT undergraduate engineering programs are designed to meet the requirements of the Canadian Engineering Accreditation Board. Each graduate is eligible to apply for licensing as a professional engineer (PEng) in any province or territory in Canada.

12.2.6 Degree requirements

To be eligible for the BEng (Hons) degree in Automotive Engineering, students must successfully complete 141 credit hours, including all courses outlined here. For elective options, see the following list. For course descriptions, see Section 16.

All courses in year one, except SSCI 1470U, are prerequisites to all non-elective courses in year three. This requirement will be strictly enforced.

All courses in years one and two, except SSCI 1470U, are prerequisites to all non-elective courses in year four. This requirement will be strictly enforced.

Approved students may undertake a co-op work term at any time before completing the program, and do so by registering in the course ENGR 0999U Engineering Co-op Program.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.engineering.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
ENGR 3200U Engineering Graphics and Design
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)
CHEM 1800U Chemistry for Engineers
SSCI 1470U Impact of Science and Technology on Society
ENGR 1200U Introduction to Programming for Engineers
ENVS 1000U Environmental Science
MATH 1020U Calculus II
PHY 1020U Physics II

YEAR 2

Semester 1 (18 credit hours)
ENGR 2220U Structure and Properties of Materials
ENGR 2230U Statics+
ENGR 2310U Concurrent Engineering and Design
ENGR 2640U Thermodynamics and Heat Transfer
MATH 2860U Differential Equations for Engineers
Liberal Studies elective*

Semester 2 (18 credit hours)
ENGR 2420U Solid Mechanics+
ENGR 2430U Dynamics
ENGR 2790U Electric Circuits
ENGR 2860U Fluid Mechanics
MATH 2070U Numerical Methods
STAT 2800U Statistics and Probability for Engineers

+Students who have completed ENGR 2260U are not required to take ENGR 2230U or ENG 2420U.

YEAR 3

Semester 1 (15 credit hours)
ENGR 3010U Introduction to Automotive Engineering+
ENGR 3030U Computer-Aided Design
ENGR 3190U Manufacturing and Production Processes
ENGR 3270U Kinematics and Dynamics of Machines
ENGR 3350U Control Systems

Semester 2 (18 credit hours)
ENGR 3210U Mechanical Vibrations
ENGR 3220U Machine Design
ENGR 3290U Powertrain Design+
ENGR 3320U Fluid Power Systems
ENGR 3390U Mechatronics
ENGR 3450U Combustion and Engines

+ENGR 3010U replaces ENGR 4260U Automotive Engineering starting 2011-2012; ENGR 3290U replaces ENGR 3000U Automotive Component Design starting in 2011-2012.

Approved students may opt to spend 12 to 16 months as an intern in an engineering setting in industry or elsewhere after year three, and do so by registering in the course ENGR 0998U Engineering Internship Program.

YEAR 4

Semester 1 (18 credit hours)
ENGR 4010U Vehicle Dynamics and Control
ENGR 4060U Automotive Structural Design
ENGR 4070U Chassis Systems Design (Starting 2012-2013)+
ENGR 4080U Automotive Systems Design I
ENGR 4210U Advanced Solid Mechanics and Stress Analysis
Engineering elective*

Semester 2 (18 credit hours)
ENGR 3360U Engineering Economics+
ENGR 4045U Quality Control
ENGR 4081U Automotive Systems Design II
ENGR 4760U Ethics, Law and Professionalism for Engineers
Engineering elective*
Engineering elective*

+Students who have completed three liberal studies electives by June 2011 are not required to take ENGR 4070U.

++Students in an Engineering and Management program take BUSI 1700U Introduction to Entrepreneurship, or a similar business and management course approved by the Faculty of Engineering and Applied Science, in place of ENGR 3360U Engineering Economics.

***Electives**

Engineering electives
Courses selected for the engineering elective must be approved by the Faculty of Engineering and Applied Science. Engineering courses from other engineering programs may be allowed as engineering electives provided students have the prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field.

The following are approved courses as engineering electives:

ENGR 3160U Engineering Operations and Project Management+
ENGR 3170U Engineering Production Management+
ENGR 3260U Introduction to Energy Systems
ENGR 3300U Integrated Manufacturing Systems
ENGR 3410U Electromechanical Energy Conversion
ENGR 4160U Artificial Intelligence in Engineering
ENGR 4240U Applied Thermal and Fluids Engineering
ENGR 4250U Advanced Engineering Materials
ENGR 4290U Finite Element Methods
ENGR 4350U Microprocessors
ENGR 4380U Life Cycle Engineering
ENGR 4540U Energy Efficiency, Management and Simulation

Note: Not all of the listed engineering electives will necessarily be offered each year.

+ENGR 3160U and ENGR 3170U are not engineering electives for students in the Automotive Engineering and Management program.

Liberal Studies electives
See Section 12.8.

12.2.7 Automotive Engineering and Management

See Section 12.7.

12.3 Program information – Bachelor of Engineering (Honours) in Electrical Engineering

12.3.1 General information

Electrical engineering is a broad field with many engineering applications and has been proven to be among the most popular of all engineering disciplines. UOIT's Electrical Engineering program teaches students to apply knowledge through analysis, design and implementation of electrical, power, control, electronic, biomedical, photonic, and wireless systems. The program of study includes courses in the areas of electronics, telecommunications, computers, control, and power systems. The curriculum assists students in understanding and applying the principles of electrical engineering and of the Canadian electrical engineering industry.

12.3.2 Admission requirements

See Section 12.2.2.

12.3.3 Work placement/internship/co-op opportunities

See Section 12.2.3.

12.3.4 Careers

Electrical engineering graduates are prepared for employment in the analysis, design, development, testing and manufacturing of electrical equipment, systems, and networks. Power utilities, consumer appliance manufacturers, industrial equipment manufacturers, telecommunications and computer industries, resource companies, biomedical engineering firms and government agencies all employ electrical engineers. With the rapid advances in technology and growing demand for electrical engineers, electrical engineering will remain one of the most sought-after disciplines in engineering. Graduates may also choose to pursue further studies for higher degrees or start their own business.

12.3.5 Professional designation

See Section 12.2.5.

12.3.6 Degree requirements

To be eligible for the BEng (Hons) degree in Electrical Engineering, students must successfully complete 126 credit hours, including all courses outlined here. For elective options, see the following list. For course descriptions, see Section 16. All courses in year one, except SSCI 1470U, are prerequisites to all non-elective courses in year three. All courses in years one and two, except SSCI 1470U, are prerequisites to all non-elective courses in year four.

Approved students may undertake a co-op work term at any time before completing the program, and do so by registering in the course ENGR 0999U Engineering Co-op Program.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.engineering.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
ENGR 1400U Information Technology for Engineers
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)
CHEM 1800U Chemistry for Engineers
SSCI 1470U Impact of Science and Technology on Society
ENGR 1200U Introduction to Programming for Engineers
MATH 1020U Calculus II
PHY 1020U Physics II
Liberal Studies elective*

YEAR 2

Semester 1 (15 credit hours)
ENGR 2110U Discrete Mathematics for Engineers
ENGR 2200U Electrical Engineering Fundamentals
ENGR 2710U Object Oriented Programming and Design
MATH 2860U Differential Equations for Engineers
Liberal Studies elective*

Semester 2 (15 credit hours)
ENGR 2210U Circuit Analysis+
ENGR 2250U Introductory Electronics
ENGR 2450U Digital Systems
ENGR 2520U Fundamentals of Electromagnetics
ENGR 2530U Complex Analysis for Engineers

+Students who have completed two liberal studies electives and BUSI 2000U or all three liberal studies electives by September 2009 are not required to take ENGR 2210U.

YEAR 3

Semester 1 (15 credit hours)
ENGR 3110U Signals and Systems
ENGR 3140U Computer Architecture
ENGR 3180U Design Principles and Project Management in Electrical Engineering++
ENGR 3230U Electronic Circuit Design
ENGR 3240U Applications for Electromagnetics

++Students who have completed the third year of their program by September 2009 and who have received credit for ENGR 2640U are not required to take ENGR 3180U.

Semester 2 (18 credit hours)
ENGR 3070U Probability and Random Signals
ENGR 3100U Modern Control Systems
ENGR 3130U Communication Systems
ENGR 3250U Electric Machines
ENGR 3360U Engineering Economics+++
ENGR 3490U Microprocessor Systems Design

+++Students in an Engineering and Management program take BUSI 1700U Introduction to Entrepreneurship, or a similar business and management course approved by the Faculty of Engineering and Applied Science, in place of ENGR 3360U Engineering Economics. Approved students may opt to spend 12 to 16 months as an intern in an engineering setting in industry or elsewhere after year three, and do so by registering in the course ENGR 0998U Engineering Internship Program.

YEAR 4

Semester 1 (15 credit hours)
ENGR 4420U DSP Theory and Design
ENGR 4650U Computer Networks
ENGR 4750U Microwave and RF Circuits
ENGR 4920U Electrical Engineering Systems Design I
Engineering elective*

Semester 2 (15 credit hours)
ENGR 4100U Modern Control Systems (Replaced by ENGR 3100U in 2009-2010)++++
ENGR 4110U Power Systems
ENGR 4760U Ethics, Law and Professionalism for Engineers
ENGR 4500U Wireless Communications
ENGR 4921U Electrical Engineering Systems Design II
Engineering elective*++++

++++For 2011-2012 ENGR 4100U will be offered for those students who have completed the third year of their program as of September 2009. It will be offered in conjunction with ENGR 3100U for 2011-2012. Additionally, these students do not take the Semester 2 Engineering elective.

***Electives**

Engineering electives
Courses selected for the engineering elective must be approved by the Faculty of Engineering and Applied Science. Engineering courses from other engineering programs may be allowed as engineering electives provided students have the prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field.

The following are approved courses as engineering electives:

ENGR 4120U Introduction to Power Electronics
ENGR 4130U Digital Communications
ENGR 4140U Power System Protection Relaying
ENGR 4150U Advanced Control Systems
ENGR 4180U Special Topics in Electrical Engineering
ENGR 4190U Multimedia Systems
ENGR 4860U Computer Graphics Design
ENGR 4890U Advanced Computer Networks
ENGR 4930U Optical Communications

Note: Not all of the listed engineering electives will necessarily be offered each year.

Liberal Studies electives
See Section 12.8.

12.3.7 Electrical Engineering and Management

See Section 12.7.

12.4 Program information – Bachelor of Engineering (Honours) in Manufacturing Engineering

12.4.1 General information

The Faculty of Engineering and Applied Science is the only one in Canada offering a dedicated program in manufacturing engineering. The program provides graduates with the knowledge and skills required for work in all areas of advanced manufacturing, including product design, automation and control, and production.

Developed in consultation with industry the manufacturing engineering curriculum provides a solid grounding in the fundamentals of mathematics, computing and science, with significant content in engineering sciences and design. In addition to classroom lectures, students participate in tutorials, laboratories, computer simulations, field visits, independent research and design tasks, individual and group projects, as well as presentations to both technical and non-technical audiences.

Complementary studies including liberal studies electives, collaborative leadership, economics, and ethics and law for professionals, promote a broader understanding of the needs of society and technology's impact on it. Students gain technical expertise along with the understanding of business and humanities required for an integrated approach to advanced manufacturing.

12.4.2 Admission requirements

See Section 12.2.2.

12.4.3 Work placement/internship/co-op opportunities

See Section 12.2.3.

12.4.4 Careers

The manufacturing industry in Ontario generates hundreds of billions of dollars in revenue annually, employing over one million people directly and another one million people indirectly. It plays a vital role in the Ontario economy, accounting for about 20 per cent of all jobs in the province and 25 per cent of Ontario's gross domestic product. Manufacturing engineering provides job opportunities in sectors ranging from aerospace and biotechnology to telecommunications, automotive, chemical, industrial and commercial product manufacturing. The types of functions that program graduates may perform in organizations are numerous and include design and development of products and processes, production planning and control, system and facility design and analysis, operations management and plant maintenance, engineering marketing and sales, economic analysis and accounting, and research and development.

Growing industrial development in Ontario coupled with current retirement rates is increasing the need for manufacturing engineers over the next decade. Graduates may also choose to pursue further studies towards higher degrees or start their own business.

12.4.5 Professional designation

See Section 12.2.5.

12.4.6 Degree requirements

To be eligible for the BEng (Hons) degree in Manufacturing Engineering, students must successfully complete 129 credit hours, including all courses outlined here. For elective options, see the following list. For course descriptions, see Section 16.

All courses in year one, except SSCI 1470U, are prerequisites to all non-elective courses in year three.

All courses in years one and two, except SSCI 1470U, are prerequisites to all non-elective courses in year four.

Approved students may undertake a co-op work term at any time before completing the program, and do so by registering in the course ENGR 0999U Engineering Co-op Program.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.engineering.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
ENGR 3200U Engineering Graphics and Design
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)
CHEM 1800U Chemistry for Engineers
SSCI 1470U Impact of Science and Technology on Society
ENGR 1200U Introduction to Programming for Engineers
ENVS 1000U Environmental Science
MATH 1020U Calculus II
PHY 1020U Physics II

YEAR 2

Semester 1 (15 credit hours)
ENGR 2220U Structure and Properties of Materials
ENGR 2230U Statics+
ENGR 2310U Concurrent Engineering and Design
ENGR 2640U Thermodynamics and Heat Transfer
MATH 2860U Differential Equations for Engineers

Semester 2 (18 credit hours)
ENGR 2420U Solid Mechanics+
ENGR 2430U Dynamics
ENGR 2790U Electric Circuits
ENGR 2860U Fluid Mechanics
MATH 2070U Numerical Methods
STAT 2800U Statistic and Probability for Engineers

+Students who have completed ENGR 2260U are not required to take ENGR 2230U or ENGR 2420U.

YEAR 3

Semester 1 (15 credit hours)
ENGR 3030U Computer-Aided Design
ENGR 3190U Manufacturing and Production Processes
ENGR 3270U Kinematics and Dynamics of Machines
ENGR 3350U Control Systems
Liberal Studies elective*

Semester 2 (15 credit hours)
ENGR 3220U Machine Design++
ENGR 3300U Integrated Manufacturing Systems
ENGR 3390U Mechatronics
ENGR 3460U Industrial Ergonomics
ENGR 4045U Quality Control

++Students who have completed three liberal studies electives and BUSI 2000U by September 2009 are not required to take ENGR 3220U.

Approved students may opt to spend 12 to 16 months as an intern in an engineering setting in industry or elsewhere after year three, and do so by registering in the course ENGR 0998U Engineering Internship Program.

YEAR 4

Semester 1 (15 credit hours)
ENGR 4280U Robotics and Automation
ENGR 4380U Life Cycle Engineering
ENGR 4390U Modelling Manufacturing Systems
ENGR 4395U Manufacturing Systems Design I
Engineering elective*

Semester 2 (18 credit hours)
ENGR 3360U Engineering Economics+++
ENGR 4015U Reliability and Maintenance
ENGR 4250U Advance Engineering Materials
ENGR 4396U Manufacturing Systems Design II
ENGR 4760U Ethics, Law and Professionalism for Engineers
Liberal Studies elective*

+++Students in an Engineering and Management program take BUSI 1700U Introduction to Entrepreneurship, or a similar business and management course approved by the Faculty of Engineering and Applied Science, in place of ENGR 3360U Engineering Economics.

***Electives**

Engineering electives
Courses selected for the engineering elective must be approved by the Faculty of Engineering and Applied Science. Engineering courses from other engineering programs may be allowed as engineering electives provided students have the prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field.

The following are approved courses as engineering electives:

ENGR 3160U Engineering Operations and Project Management+
ENGR 3170U Engineering Production Management+
ENGR 3210U Mechanical Vibrations
ENGR 3260U Introduction to Energy Systems
ENGR 3410U Electromechanical Energy Conversion
ENGR 4160U Artificial Intelligence in Engineering
ENGR 4210U Advanced Solid Mechanics and Stress Analysis
ENGR 4240U Applied Thermal and Fluids Engineering
ENGR 4260U Automotive Engineering
ENGR 4290U Finite Element Methods
ENGR 4350U Microprocessors
ENGR 4540U Energy Efficiency, Management and Simulation

Note: Not all of the listed engineering electives will necessarily be offered each year.

+ENGR 3160U and ENGR 3170U are not Engineering electives for students in the Manufacturing Engineering and Management program.

Liberal Studies electives
See Section 12.8.

12.4.7 Manufacturing Engineering and Management

See Section 12.7.

12.5 Program information – Bachelor of Engineering (Honours) in Mechanical Engineering

- Comprehensive Mechanical Engineering program – BEng (Hons);
- Energy Engineering option – BEng (Hons); and
- Mechatronics Engineering option – BEng (Hons).

12.5.1 General information

UOIT's four-year Mechanical Engineering program offers a Comprehensive Mechanical Engineering program, as well as Mechanical Engineering with an option in Energy Engineering or Mechatronics Engineering. These unique areas of mechanical engineering are in high demand by various industries and employers.

In the first two years, students take fundamental courses in math, sciences, and computing, as well as introductory engineering courses. Many courses in the first two years are common to many engineering programs offered at UOIT. In the last two years of study, students focus on their area of option either in traditional Mechanical Engineering (Comprehensive program) or Mechanical Engineering with an option in Energy Engineering or Mechatronics Engineering.

12.5.2 Admission requirements

See Section 12.2.2.

12.5.3 Work placement/internship/co-op opportunities

See Section 12.2.3.

12.5.4 Careers

Graduates of the Mechanical Engineering program will have the expertise to work and manage the work of others in areas of research, development, design, analysis, maintenance, and operations. These opportunities arise in a variety of industries and services including automotive, heavy and precision machinery, heating, ventilation and air conditioning, machines and mechanisms, transportation, dynamics and vibrations, prime movers, robotics and automation, information/telecommunications, and energy and environment. Careers are available in private enterprise, as well as government and non-government organizations. Graduates may also choose to pursue further studies for higher degrees or start their own business.

12.5.5 Professional designation

See Section 12.2.5.

12.5.6 Degree requirements – Mechanical Engineering: Comprehensive program

To be eligible for the BEng (Hons) degree in Mechanical Engineering (Comprehensive program), students must successfully complete 126 credit hours, including all courses outlined here. For elective options, see the following list. For course descriptions, see Section 16.

All courses in year one, except SSCI 1470U, are prerequisites to all non-elective courses in year three.

All courses in years one and two, except SSCI 1470U, are prerequisites to all non-elective courses in year four.

Approved students may undertake a co-op work term at any time before completing the program, and do so by registering in the course ENGR 0999U Engineering Co-op Program.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.engineering.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
ENGR 3200U Engineering Graphics and Design
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)
CHEM 1800U Chemistry for Engineers
SSCI 1470U Impact of Science and Technology on Society
ENGR 1200U Introduction to Programming for Engineers
ENVS 1000U Environmental Science
MATH 1020U Calculus II
PHY 1020U Physics II

YEAR 2

Semester 1 (15 credit hours)
ENGR 2220U Structure and Properties of Materials
ENGR 2230U Statics+
ENGR 2310U Concurrent Engineering and Design
ENGR 2320U Thermodynamics
MATH 2860U Differential Equations for Engineers

Semester 2 (18 credit hours)
ENGR 2420U Solid Mechanics+
ENGR 2430U Dynamics
ENGR 2790U Electric Circuits
ENGR 2860U Fluid Mechanics
MATH 2070U Numerical Methods
STAT 2800U Statistics and Probability for Engineers

+Students who have completed ENGR 2260U are not required to take ENGR 2230U or ENGR 2420U.

YEAR 3

Semester 1 (15 credit hours)
ENGR 3030U Computer-Aided Design
ENGR 3190U Manufacturing and Production Processes
ENGR 3270U Kinematics and Dynamics of Machines
ENGR 3350U Control Systems
Liberal Studies elective*

Semester 2 (15 credit hours)
ENGR 3210U Mechanical Vibrations
ENGR 3220U Machine Design
ENGR 3360U Engineering Economics++
ENGR 3390U Mechatronics
ENGR 3930U Heat Transfer

++Students in an Engineering and Management program take BUSI 1700U Introduction to Entrepreneurship, or a similar management course approved by the Faculty of Engineering and Applied Science, in place of ENGR 3360U Engineering Economics.

Approved students may opt to spend 12 to 16 months as an intern in an engineering setting in industry or elsewhere after year three, and do so by registering in the course ENGR 0998U Engineering Internship Program.

YEAR 4

Semester 1 (15 credit hours)
ENGR 4210U Advanced Solid Mechanics and Stress Analysis
ENGR 4220U Mechanical Systems Design I
ENGR 4280U Robotics and Automation
Two Engineering electives*

Semester 2 (15 credit hours)
ENGR 4240U Applied Thermal and Fluids Engineering
ENGR 4250U Advanced Materials Engineering
ENGR 4760U Ethics, Law and Professionalism for Engineers
ENGR 4221U Mechanical Systems Design II
Engineering elective*

***Electives**

Engineering electives
Courses selected for the engineering elective must be approved by the Faculty of Engineering and Applied Science. Engineering courses from other engineering programs may be allowed as engineering electives provided students have the prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field.

The following are approved courses as engineering electives:

ENGR 3160U Engineering Operations and Project Management+
ENGR 3170U Engineering Production Management+
ENGR 3260U Introduction to Energy Systems
ENGR 3300U Integrated Manufacturing Systems
ENGR 3410U Electromechanical Conversion
ENGR 3460U Industrial Ergonomics
ENGR 4045U Quality Control
ENGR 4160U Artificial Intelligence in Engineering
ENGR 4260U Automotive Engineering
ENGR 4290U Finite Element Methods
ENGR 4350U Microprocessors
ENGR 4380U Life Cycle Engineering
ENGR 4540U Energy Efficiency, Management and Simulation

Note: Not all of the listed engineering electives will necessarily be offered each year.

+ENGR 3160U and ENGR 3170U are not Engineering electives for students in the Mechanical Engineering and Management program.

Liberal Studies electives
See Section 12.8.

12.5.7 Degree requirements – Mechanical Engineering: Energy Engineering option

To be eligible for the BEng (Hons) degree in Mechanical Engineering (Energy Engineering option), students must successfully complete 129 credit hours, including all courses outlined here. For elective options, see the following list. For course descriptions, see Section 16.

All courses in year one, except SSCI 1470U, are prerequisites to all non-elective courses in year three.

All courses in years one and two, except SSCI 1470U, are prerequisites to all non-elective courses in year four.

Approved students may undertake a co-op work term at any time before completing the program, and do so by registering in the course ENGR 0999U Engineering Co-op Program.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.engineering.uoit.ca.**

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
ENGR 3200U Engineering Graphics and Design
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)
CHEM 1800U Chemistry for Engineers
SSCI 1470U Impact of Science and Technology on Society
ENGR 1200U Introduction to Programming for Engineers
ENVS 1000U Environmental Science
MATH 1020U Calculus II
PHY 1020U Physics II

YEAR 2

Semester 1 (15 credit hours)
ENGR 2220U Structure and Properties of Materials
ENGR 2230U Statics[+]
ENGR 2310U Concurrent Engineering and Design
ENGR 2320U Thermodynamics
MATH 2860U Differential Equations for Engineers

Semester 2 (18 credit hours)
ENGR 2430U Dynamics
ENGR 2790U Electric Circuits
ENGR 2860U Fluid Mechanics
MATH 2070U Numerical Methods
STAT 2800U Statistics and Probability for Engineers
ENGR 2420U Solid Mechanics[+]

[+]Students who have completed ENGR 2260U are not required to take ENGR 2230U or ENGR 2420U.

YEAR 3

Semester 1 (15 credit hours)
ENGR 3030U Computer-Aided Design
ENGR 3190U Manufacturing and Production Processes
ENGR 3260U Introduction to Energy Systems
ENGR 3350U Control Systems
ENGR 3270U Kinematics and Dynamics of Machines[++]

[++]Students who have completed one liberal studies elective and BUSI 2000U by September 2009 are not required to take ENGR 3270U.

Semester 2 (18 credit hours)
ENGR 3220U Machine Design[+++]
ENGR 3320U Fluid Power Systems
ENGR 3360U Engineering Economics[++++]
ENGR 3450U Combustion and Engines
ENGR 3930U Heat Transfer
ENGR 4240U Applied Thermal and Fluids Engineering

[+++]Students in an Engineering and Management program take BUSI 1700U Introduction to Entrepreneurship, or a similar business and management course approved by the Faculty of Engineering and Applied Science, in place of ENGR 3360U Engineering Economics.

[++++]Students who have completed BUSI 2000U by September 2009 are not required to take ENGR 3220U.

Approved students may opt to spend 12 to 16 months as an intern in an engineering setting in industry or elsewhere after year three, and do so by registering in the course ENGR 0998U Engineering Internship Program.

YEAR 4

Semester 1 (15 credit hours)
ENGR 4230U Thermofluids and Energy Systems Design I
ENGR 4430U Sustainable and Alternative Energy Technologies[+++++]
ENGR 4380U Life Cycle Engineering[+++++]
ENGR 4410U Fossil Fuel Energy Conversion Engineering elective*
[+++++]Students who have completed two liberal studies electives and BUSI 2000U by September 2009 are permitted to take only one of ENGR 4430U and ENGR 4380U.

Semester 2 (15 credit hours)
ENGR 3410U Electromechanical Energy Conversion or
ENGR 4440U Advanced Power Generation[◊]
ENGR 4450U Thermal Environmental Engineering
ENGR 4760U Ethics, Law and Professionalism for Engineers

ENGR 4231U Thermofluids and Energy Systems Design II
Liberal Studies elective*

◊Not all listed choices will necessarily be offered each year.

***Electives**

Engineering electives
Courses selected for the engineering elective must be approved by the Faculty of Engineering and Applied Science. Engineering courses from other engineering programs may be allowed as engineering electives provided students have the prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field.

ENGR 3160U Engineering Operations and Project Management+
ENGR 3170U Engineering Production Management+
ENGR 3210U Mechanical Vibrations
ENGR 3300U Integrated Manufacturing Systems
ENGR 3460U Industrial Ergonomics
ENGR 4045U Quality Control
ENGR 4160U Artificial Intelligence in Engineering
ENGR 4250U Advanced Engineering Materials
ENGR 4260U Automotive Engineering
ENGR 4290U Finite Element Methods
ENGR 4540U Energy Efficiency, Management and Simulation

Note: Not all of the listed engineering electives will necessarily be offered each year.

+ENGR 3160U and ENGR 3170U are not Engineering electives for students in the Mechanical Engineering and Management program.

Liberal Studies electives
See Section 12.8.

12.5.8 Degree requirements – Mechanical Engineering: Mechatronics Engineering option

To be eligible for the BEng (Hons) degree in Mechanical Engineering (Mechatronics Engineering option), students must successfully complete 129 credit hours, including all courses outlined here. For elective options, see the following list. For course descriptions, see Section 16.

All courses in year one, except SSCI 1470U, are prerequisites to all non-elective courses in year three.

All courses in years one and two, except SSCI 1470U, are prerequisites to all non-elective courses in year four.

Approved students may undertake a co-op work term at any time before completing the program, and do so by registering in the course ENGR 0999U Engineering Co-op Program.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.engineering.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
ENGR 3200U Engineering Graphics and Design
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)
CHEM 1800U Chemistry for Engineers
SSCI 1470U Impact of Science and Technology on Society
ENGR 1200U Introduction to Programming for Engineers
ENVS 1000U Environmental Science
MATH 1020U Calculus II
PHY 1020U Physics II

YEAR 2

Semester 1 (18 credit hours)
ENGR 2220U Structure and Properties of Materials
ENGR 2230U Statics+
ENGR 2310U Concurrent Engineering and Design
ENGR 2640U Thermodynamics and Heat Transfer
ENGR 2710U Object Oriented Programming and Design++
MATH 2860U Differential Equations for Engineers

++Students who have completed the second year of their program by September 2009 and who have received credit for BUSI 2000U are not required to take ENGR 2710U.

Semester 2 (18 credit hours)
ENGR 2420U Solid Mechanics+
ENGR 2430U Dynamics
ENGR 2790U Electric Circuits
ENGR 2860U Fluid Mechanics
MATH 2070U Numerical Methods
STAT 2800U Statistics and Probability for Engineers

+Students who have completed ENGR 2260U are not required to take ENGR 2230U or ENGR 2420U.

YEAR 3

Semester 1 (15 credit hours)
ENGR 3030U Computer-Aided Design
ENGR 3190U Manufacturing and Production Processes
ENGR 3270U Kinematics and Dynamics of Machines
ENGR 3350U Control Systems
Liberal Studies elective*

Semester 2 (18 credit hours)
ENGR 2720U Software Requirements Specification and Analysis+++
ENGR 3210U Mechanical Vibrations++++
ENGR 3220U Machine Design++++
ENGR 3320U Fluid Power Systems
ENGR 3330U Circuit Design
ENGR 3390U Mechatronics

+++Students who have completed the second year of their program by September 2009 are not required to take ENGR 2720U.

++++Students who have completed three liberal studies electives and BUSI 2000U by September 2009 are not required to take ENGR 3210U and ENGR 3220U. Students who have completed two liberal studies electives and BUSI 2000U or three liberal studies electives by September 2009 may take either ENGR 3210U or ENGR 3220U.

Approved students may opt to spend 12 to 16 months as an intern in an engineering setting in industry or elsewhere after year three, and do so by registering in the course ENGR 0998U Engineering Internship Program.

YEAR 4

Semester 1 (15 credit hours)
ENGR 4280U Robotics and Automation
ENGR 4310U Electronics
ENGR 4330U Mechatronic Systems Design I
ENGR 4350U Microprocessors
Engineering elective*

Semester 2 (15 credit hours)
ENGR 3360U Engineering Economics+++++
ENGR 3410U Electromechanical Energy Conversion
ENGR 4320U Advanced Mechatronics
ENGR 4331U Mechatronic Systems Design II
ENGR 4760U Ethics, Law and Professionalism for Engineers

+++++Students in an Engineering and Management program take BUSI 1700U Introduction to Entrepreneurship, or a similar management course approved by the Faculty of Engineering and Applied Science, in place of ENGR 3360U Engineering Economics.

***Electives**

Engineering electives
Courses selected for the engineering elective must be approved by the Faculty of Engineering and Applied Science. Engineering courses from other engineering programs may be allowed as engineering electives provided students have the prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field.

The following are approved courses as engineering electives:

ENGR 3160U Engineering Operations and Project Management+
ENGR 3170U Engineering Production Management+
ENGR 3260U Introduction to Energy Systems
ENGR 3300U Integrated Manufacturing Systems
ENGR 3460U Industrial Ergonomics
ENGR 4045U Quality Control
ENGR 4160U Artificial Intelligence in Engineering
ENGR 4210U Advanced Solid Mechanics and Stress Analysis
ENGR 4240U Applied Thermal and Fluids Engineering
ENGR 4250U Advanced Engineering Materials
ENGR 4260U Automotive Engineering
ENGR 4290U Finite Element Methods
ENGR 4380U Life Cycle Engineering
ENGR 4540U Energy Efficiency, Management and Simulation

Note: Not all of the listed engineering electives will necessarily be offered each year.

+ENGR 3160U and ENGR 3170U are not Engineering electives for students in the Mechanical Engineering and Management program.

Liberal Studies electives
See Section 12.8.

12.5.9 Mechanical Engineering and Management

See Section 12.7.

12.6 Program information – Bachelor of Engineering (Honours) in Software Engineering

12.6.1 General information

With growing market demand, software engineering is one of Canada's newest engineering disciplines; however, there are few software engineering programs in Canada. UOIT's Software Engineering program focuses on the design of computer software and is exposed to software design for robotics, embedded systems, computer networks, real-time control systems, multi-media, and man-machine interfaces. Courses including software design, user interface, advanced networks, design and analysis of algorithms, and software project management prepare graduates for successful careers in the software engineering field.

12.6.2 Admission requirements

See Section 12.2.2.

12.6.3 Work placement/internship/co-op opportunities

See Section 12.2.3.

12.6.4 Careers

The software industry has grown dramatically and has significantly impacted the global economy. Mechanical and electronic devices in automobiles, airplanes, communication equipment and manufacturing systems are being replaced by software components to provide more adaptability and enhanced functionality. Software components are more easily adapted, integrated, and upgraded to meet future needs and are less expensive to implement. Graduates will find employment in both the private and public sectors. With the emerging need for more powerful and higher-quality software systems, the demand for software engineers continues to grow. Graduates may also choose to pursue further studies for higher degrees or start their own business.

12.6.5 Professional designation

See Section 12.2.5.

12.6.6 Degree requirements

To be eligible for the BEng (Hons) degree in software engineering, students must successfully complete 126 credit hours, including all courses outlined here. For elective options, see the following list. For course descriptions, see Section 16.

All courses in year one, except SSCI 1470U, are prerequisites to all non-elective courses in year three.

All courses in years one and two, except SSCI 1470U, are prerequisites to all non-elective courses in year four.

Approved students may undertake a co-op work term at any time before completing the program, and do so by registering in the course ENGR 0999U Engineering Co-op Program.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.engineering.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
COMM 1050U Technical Communications
ENGR 1400U Information Technology for Engineers
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)
CHEM 1800U Chemistry for Engineers
SSCI 1470U Impact of Science and Technology on Society
ENGR 1200U Introduction to Programming for Engineers
MATH 1020U Calculus II
PHY 1020U Physics II
Liberal Studies elective*

YEAR 2

Semester 1 (15 credit hours)
ENGR 2110U Discrete Mathematics for Engineers
ENGR 2200U Electrical Engineering Fundamentals
ENGR 2710U Object Oriented Programming and Design
MATH 2860U Differential Equations for Engineers
Liberal Studies elective*

Semester 2 (18 credit hours)
ENGR 2250U Introductory Electronics
ENGR 2450U Digital Systems
ENGR 2490U Software Project Management
ENGR 2715U Data Structures+
ENGR 2720U Software Requirements Specification and Analysis
STAT 2800U Statistics and Probability for Engineers

+Students who have completed three liberal studies electives, or two liberal studies electives and BUSI 2000U, by September 2009 are not required to take ENGR 2715U.

YEAR 3

Semester 1 (15 credit hours)
ENGR 3140U Computer Architecture
ENGR 3650U Software Design and Architectures
ENGR 3770U Design and Analysis of Algorithms
ENGR 3950U Operating Systems
Science elective*++◊

++Students who have completed three liberal studies electives and BUSI 2000U by September 2009 are not required to take the science elective.

Semester 2 (15 credit hours)
ENGR 3360U Engineering Economics+++
ENGR 3700U Data Management Systems◊
ENGR 3720U Introduction to Artificial Intelligence
ENGR 3960U Programming Languages and Compilers
ENGR 3980U Software Quality

+++Students in an Engineering and Management program take BUSI 1700U Introduction to Entrepreneurship, or a similar business and management course approved by the Faculty of Engineering and Applied Science, in place of ENGR 3360U Engineering Economics.

◊ Pending Academic Council approval, the Science elective will move to Semester 2 and ENGR 3700U Data Management Systems will move to Semester 1 for Year 3 of this program.

Approved students may opt to spend 12 to 16 months as an intern in an engineering setting in industry or elsewhere after year three, and do so by registering in the course ENGR 0998U Engineering Internship Program.

YEAR 4

Semester 1 (15 credit hours)
ENGR 4650U Computer Networks
ENGR 4790U Distributed Systems
ENGR 4850U User Interfaces
ENGR 4900U Software Systems Design I
Engineering elective*

Semester 2 (15 credit hours)
ENGR 4760U Ethics, Law and Professionalism for Engineers
ENGR 4901U Software Systems Design II
Three Engineering electives*

***Electives**

Engineering electives
Courses selected for the engineering elective must be approved by the Faculty of Engineering and Applied Science. Engineering courses from other engineering programs may be allowed as engineering electives provided students have the prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field.

The following are approved courses as engineering electives:

ENGR 3490U Microprocessor Systems Design
ENGR 4800U Advanced Operating Systems
ENGR 4820U Modelling and Simulation
ENGR 4830U Real Time Systems and Control
ENGR 4840U Software and Computer Security
ENGR 4860U Computer Graphics Design
ENGR 4870U Special Topics in Software Engineering
ENGR 4890U Advanced Computer Networks

Note: Not all of the listed engineering electives will necessarily be offered each year.

Science electives
Courses selected for the science elective must be approved by the Faculty of Engineering and Applied Science. Science courses from other UOIT programs may be allowed as science electives provided students have the prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field.

The following are approved courses as science electives:

BIOL 1840U Biology for Engineers
ENVR 1000U Environmental Science
ENVR 2010U Introductory Environmental Science
HLSC 1200U Anatomy and Physiology I
SCIE 1900U Astronomy

Liberal Studies electives
See Section 12.8.

12.6.7 Software Engineering and Management

See Section 12.7.

12.7 Program information – Engineering and Management programs

12.7.1 General information

The Engineering and Management combination programs meet the rapidly increasing need for engineers with the leadership skills to succeed in business and management.

UOIT offers Engineering and Management programs in:

- Automotive Engineering;
- Electrical Engineering;
- Manufacturing Engineering;
- Mechanical Engineering (Comprehensive program, Energy Engineering option, Mechatronics Engineering option); and
- Software Engineering.

Students study the complete engineering program, and also gain critical management skills in key areas of business including accounting, finance, operations, human resources and marketing.

Students in these programs take two semesters of business and management courses for 30 credit hours after successfully completing third year. The regular fourth year of the engineering program is then taken in year five of the program. The two semesters of business and management courses may be taken at other years in the program with permission.

12.7.2 Admission requirements

See Section 12.2.2.

12.7.3 Work placement/internship/co-op opportunities

See Section 12.2.3.

12.7.4 Careers

Graduates of the engineering and management programs will be in high demand among employers in Ontario and beyond, working in areas of research, development, design, maintenance and operations in a variety of industries and services including transportation (especially automotive and aerospace), heavy and precision machinery, robotics, information/telecommunications, electronics, computer, energy, chemical, construction and other sectors. With additional expertise in business and management, graduates of these programs will have a broader understanding of the business and management aspects of companies, allowing them to readily take on managerial roles or start their own business. Graduates may also choose to pursue further studies toward higher degrees. The courses in the business and management year may be creditable towards the course requirements of advanced degrees such as an MBA.

12.7.5 Professional designation

See Section 12.2.5.

12.7.6 Program details and degree requirements

Bachelor of Engineering and Management (Honours) in Automotive Engineering and Management – BEng and Mgt (Hons)

Bachelor of Engineering and Management (Honours) in Electrical Engineering and Management – BEng and Mgt (Hons)

Bachelor of Engineering and Management (Honours) in Manufacturing Engineering and Management – BEng and Mgt (Hons)

Bachelor of Engineering and Management (Honours) in Mechanical Engineering and Management – BEng and Mgt (Hons)
- Comprehensive Mechanical Engineering program;
- Energy Engineering option; and
- Mechatronics Engineering option.

Bachelor of Engineering and Management (Honours) in Software Engineering and Management – BEng and Mgt (Hons)

The Engineering and Management programs follow the same program map as the four-year degree program for each option with two differences. First, in year three, semester two, students substitute ENGR 3360U Engineering Economics with BUSI 1700U Introduction to Entrepreneurship, or a similar business/ management course approved by the Faculty of Engineering and Applied Science. Second, the program includes the addition of 10 courses (listed below) in fourth year.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.engineering.uoit.ca**.

YEAR 4

Semester 1 (15 credit hours)
BUSI 1101U Financial Accounting
BUSI 2201U Marketing I
BUSI 2311U Organizational Behaviour
BUSI 2401U Finance I
ENGR 3160U Engineering Operations and Project Management **

Semester 2 (15 credit hours)
BUSI 2170U Managerial Accounting
BUSI 2202U Marketing II
BUSI 2312U Introduction to Human Resources Management
BUSI 2402U Finance II
ENGR 3170U Engineering Production Management **

YEAR 5

Students take the fourth year of the appropriate engineering program in year five.

**Starting 2011-2012, the courses ENGR 3160U and ENGR 3170U replace ENGR 2340U Engineering Operations and Project Management I and ENGR 2350U Engineering Operations and Project Management II respectively. In previous years, those may have been substituted by BUSI 2603U and BUSI 2604U, respectively.

Students should consult the Faculty of Engineering and Applied Science to determine which courses are running.

12.8 Liberal Studies electives

Complementary studies, including courses in humanities, social sciences, arts, management, engineering economics, ethics and communication, are included in engineering programs to complement the technical content of the curriculum and thereby provide graduates with a broader perspective of their role in society. Inclusion of complementary studies also satisfies several accreditation criteria of the Canadian Engineering

Accreditation Board. Courses or parts of courses covering engineering economics, ethics, and the impact of technology on society, as well as courses that develop the student's capability to communicate orally, visually and in writing, are essential to the education of an engineer and therefore are included in all engineering programs at UOIT.

Liberal studies electives are included in each engineering program to ensure adequate coverage of subject matter that deals with central issues, methodologies and thought processes of the humanities and social sciences. Such material is required in the education of an engineer. Liberal studies electives can include, but are not limited to, courses dealing with cultural analysis; historical analysis; literature and the arts; knowledge, cognition, and moral reasoning; and social and behavioural analysis.

Foreign language and business courses may not be used as liberal studies. Courses can be approved as liberal studies electives for students in engineering programs at UOIT by the dean of the Faculty of Engineering and Applied Science (or designate), in accordance with these principles.

Courses selected for the liberal studies electives must be approved by the Faculty of Engineering and Applied Science. Liberal studies electives are subject to change. An updated list of liberal studies electives will be maintained online at **www.uoit.ca**.

The following are approved as liberal studies electives:

ANTH 2030H Technology and Humanity*
ANTH 2040H Law and Order in Ancient and Contemporary Culture*
CANN 2225T Ontario since 1945: From the "common good" to "common sense"*
GEOG 1030H Human Geographies in Global Context*
HIST 1201T Western Civilization from the Middle Ages to 1800*
HIST 1202T Western Civilization from 1800 to the present*
HIST 1701H World History to 1800*
HIST 1702H World History After 1800*
HIST 2101T War and Society*
HIST 2601T Public Health and Medicine*
HIST 2601H Public Health and Medicine*
IDST 1000T Human Inequality in Global Perspective*
PHIL 1002T Introduction to Philosophic Inquiry: Moral and Political Philosophy*
PHIL 1003H Introduction to Philosophy: Knowledge*
PHIL 1004H Informal Logic*
PSYC 1000U Introductory Psychology
PSYC 2010U Developmental Psychology
SOCI 1000U Introductory Sociology
SSCI 1000U Introduction to Criminal Justice
SSCI 1200U Introduction to Social Policy
SSCI 2010U Criminal Law
SSCI 1300U Social Problems
SSCI 2011U Customs and Immigration Law
SSCI 2020U Issues in Diversity
SSCI 2021U Issues in the Family
SSCI 2050U Rights and Freedoms in the Justice System
SSCI 2280U The Information Society
SSCI 2800U Social Theory Foundations
SSCI 2810U Sociological Theories of Crime
SSCI 2820U Psychological Explanations of Criminal Behaviour
WMST 1000T Introduction to Gender – Women's Studies*

*Offered through Trent University at the University of Ontario Institute of Technology. Not all courses will be offered each year.

12.9 First-year Engineering Transition Program

The objective of the First-year Engineering Transition Program is to provide first-year engineering students with an opportunity, before the start of second year, to complete first-year courses for which they have not obtained credit, to upgrade their grade point average and academic standing, and to improve their preparation for studies in subsequent years.

The program involves a second offering of demanding first-year courses, according to the following schedule:

Winter semester	Summer semester
MATH 1010U Calculus I	CHEM 1800U Chemistry for Engineers
PHY 1010U Physics I	ENGR 1200U Introduction to Programming
	ENGR 1400U Information Technology for Engineers
	ENGR 3200U Engineering Graphics and Design
	MATH 1020U Calculus II
	MATH 1850U Linear Algebra for Engineers
	PHY 1020U Physics II

At the end of the fall semester, engineering students who have failed or are missing Calculus I (MATH 1010U) or Physics I (PHY 1010U), are encouraged to take the course(s) during the winter semester. Students on academic warning will likely be required to take or repeat the courses which they have not already passed. The follow-up courses, Calculus II (MATH 1020U) and Physics II (PHY 1020U), along with the other above-noted first-year courses, will be offered during the summer semester.

Students who register in and successfully complete the transition program courses will have their academic standing re-evaluated. This re-evaluation will include all the grades received in transition program courses.

SECTION 13: FACULTY OF HEALTH SCIENCES

Dean: Mary Bluechardt, EMT, BPHE, MSc, PhD

Program directors:

Graduate Studies – Robert Weaver, BA, MA, PhD

Health Science – Paul Yielder, DCR(R) DipEd, PhD

Medical Laboratory Science – Joan Laurie, MHSM, MLT

Nursing – Sue Coffey, RN, PhD

Professors:

Carolyn Byrne, RN, MHSc, PhD

Bernadette Murphy, BA, DC, MSc, PhD

Jay Shiro Tashiro, RN, BSN, PhD

Robert Weaver, BA, MA, PhD

Associate professors:

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Wally Bartfay, RN, MN, PhD

Sue Coffey, RN, PhD

Holly Jones-Taggart, BSc (Hons), PhD

Manon Lemonde, RN, PhD

Gail Lindsay, RN, BScN, MScN, PhD

Carolyn McGregor, BAppSc, PhD

Otto Sanchez, MD, MSc, PhD

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Assistant professors:

Brenda Gamble, BA, MSc, PhD

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Meghann Lloyd, BKin (Hons), MA, PhD

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Kevin Power, CEP, BKin, MPE, PhD

John Samis, BSc (Hons), PhD

Paul Yielder, DCR(R) DipEd, PhD

Lecturers:

Nancy Bergeron, BHA, MA, MLT, ART

Lavern Bourne, BHA, MLT

Patricia Munro-Gilbert, RN, BScN, MN

Helene-Marie Goulding, MLT

Michelle Hogan, RN, BScN, MSc

Kerry Johnson, MAEd, CHIM

Amanda Laird, RN, BScN, MN

Evelyn Moreau, MLT, ART

Ruth Simpson, MLT

Donna Smeeton, BTech, MLT

Connie Thurber, BScMT, ASCP(SC), MLT

Colleen Wilkinson, RN, BScN, MS(Nsg)

Senior academic advisors:

Darci Aylward, BA

Tracey Szarka, BSc

Academic advisor:

Andrea Mars, BA

www.healthsciences.uoit.ca

13.1 Degrees offered

Bachelor of Allied Health Sciences (Honours) – BAHSc (Hons)

Bachelor of Health Science (Honours) – BHSc (Hons)

- Comprehensive program;
- Health Information Management specialization;
- Kinesiology specialization: Exercise Science option; and
- Kinesiology specialization: Health and Wellness option.

Bachelor of Health Science (Honours) in Medical Laboratory Science – BHSc (Hons)

Bachelor of Science in Nursing (Honours) – BScN (Hons)

In the Faculty of Health Sciences, students acquire the foundations for excellence in clinical practice along with the lifelong learning, research, teamwork and leadership skills essential for a successful career in the health field. The degree programs in the Faculty of Health Sciences are designed to prepare graduates for rewarding careers in the 21st century.

The faculty provides state-of-the-art, technically-enhanced laboratories and facilities. Students in the Faculty of Health Sciences will benefit from the university's mobile learning environment (see Section 1.2).

The research focus on community health issues is enhanced through partnerships with local hospitals, public health organizations and social service agencies.

13.2 Program information – Bachelor of Allied Health Sciences (Honours) – BAHSc (Hons)

13.2.1 General information

The Bachelor of Allied Health Sciences (Honours) is a career-oriented program, intended to serve the educational needs of graduates from diploma programs in health disciplines. This opportunity will prepare allied health professionals who are needed to fill leadership and teaching positions in the evolving health care system.

The Bachelor of Allied Health Sciences (Honours) is a multi-focused undergraduate degree designed to engage students in the examination of diverse aspects of health and health care delivery and health research. The BAHSc (Hons) will enrich the specific credentials of diploma graduates with additional breadth and depth of knowledge of health care and of the disciplines and professions that work in the integrated system. UOIT intends to provide Ontario with efficient and well-educated health workers ready to take on leadership roles.

13.2.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Individuals seeking admission to the BAHSc (Hons) must be graduates from one of the identified health professional Ontario College diploma programs (or equivalent) with a cumulative GPA of 2.7 or higher (on a 4 point scale).

Students must complete the following bridging courses with a minimum 2.3 GPA (on a 4.3 point scale) or higher in each:

- HLSC 1701U Academic Writing: Perspectives in Health; and
- HLSC 2700U Mathematical Reasoning in Health Sciences.

13.2.3 Careers

Graduates are equipped with the knowledge and practical skills required for success in many emerging positions currently being developed in the health sector. Students may choose to specialize in areas that lead to work in management, informatics, or the education sector. Graduates may also choose a career in research or pursue graduate studies.

13.2.4 Degree requirements

120 credits including:

a) 57 credits block standing for credits obtained in previous health-related diploma.

b) Major requirements – 42 credit hours including:

- HLSC 1701U Academic Writing: Perspectives in Health;
- HLSC 2201U Introduction to Health Information Management;
- HLSC 2601U Introduction to Health Management;
- HLSC 2700U Mathematical Reasoning in Health Sciences;
- HLSC 2800U Health and Wellness;
- HLSC 3601U Interprofessional Health Care Teams;
- HLSC 3710U Ethics;
- HLSC 3800U Critical Appraisal of Statistics in Health Science;
- HLSC 3805U Introduction to Epidemiology;
- HLSC 3910U Research Methods for Health Care Professionals: Theory and Application;
- HLSC 4820U Interdisciplinary Collaboration;
- HLSC 4850U Current Issues in Health Care; and
- HLSC 4996U/4997U Research Applications I/II or
  HLSC 4998U/4999U Research Applications I/II.

c) Elective requirements: 21 credit hours.

13.3 Program information – Bachelor of Health Science (Honours) – BHSc (Hons)

13.3.1 General information

The Bachelor of Health Science (Honours) programs have been designed to meet the needs of undergraduates aspiring to enter a variety of health-related careers or wishing to pursue postgraduate studies.

The Bachelor of Health Science (Honours) is a multi-focused undergraduate degree designed to engage students in the examination of diverse aspects of health and health-care delivery and health research. Graduates are positioned to formulate questions related to human health, address technical and theoretical problems, and excel at analytical thinking.

13.3.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a minimum grade of 60 per cent, Biology (SBI4U), and one of Advanced Functions (MHF4U) or Calculus and Vectors (MCV4U) or Mathematics of Data Management (MDM4U). It is recommended for students applying to the Kinesiology specialization: Exercise Science option, that Chemistry (SCH4U) is also taken. All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

13.3.3 Careers

Graduates are equipped with the knowledge and practical skills required for success in many emerging positions currently being developed in the health sector. The interdisciplinary nature of this program allows for many career options. Professional career opportunities and directions for further education may include health management, government, insurance, pharmacy and pharmaceutical industry, health information management, health education, project management, and wellness programming. Graduates may also choose a career in research or pursue graduate studies.

13.3.4 Degree requirements

To be eligible for the BHSc (Hons) degree, students must successfully complete 120 credit hours. Degree and program requirements are subject to change without notice. The following program map is only a guide and is to be used in combination with proper advising. Students wishing to make changes to their program of study should consult their academic advisor. For course descriptions, see Section 16.

13.3.5 Program details – Comprehensive program

The Comprehensive program in Health Science provides students with a broad-based education in health science and enables students to build a program that suits their needs. The curriculum provides an opportunity for students to take carefully selected foundation courses and augment their learning with a custom blend of courses from health sciences, science, business and liberal arts. Through the integration of disciplines, students gain an understanding of health from biological, behavioural and population-based perspectives.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.healthsciences.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CSCI 1800U Computing Tools for Health Sciences*
HLSC 1200U Anatomy and Physiology I
HLSC 1701U Academic Writing: Perspectives in Health
Elective

Semester 2 (15 credit hours)
BIOL 1020U Biology II
HLSC 1201U Anatomy and Physiology II
PSYC 1000U Introductory Psychology
Two electives

YEAR 2

Semester 1 (15 credit hours)
HLSC 2201U Introduction to Health Information Management
HLSC 2400U Introduction to Movement Neuroscience
HLSC 2462U Altered Physiology: Mechanisms of Disease I
HLSC 2800U Health and Wellness
SOCI 1000U Introduction to Sociology

Semester 2 (15 credit hours)
HLSC 2030U Theory and Practice of Interpersonal Communication
HLSC 2463U Altered Physiology: Mechanisms of Disease II
HLSC 2601U Introduction to Health Management
HLSC 2801U Understanding Health Care and Therapeutics in Canada
HLSC 3800U Critical Appraisal of Statistics in Health Science

YEAR 3

Semester 1 (15 credit hours)
HLSC 3710U Ethics
HLSC 3805U Introduction to Epidemiology
HLSC 3910U Research Methods for Health Care Professionals: Theory and Application
Two electives

Semester 2 (15 credit hours)
HLSC 3501U Health Law
HLSC 3601U Interprofessional Health Care Teams
HLSC 3630U Health Finance
Two electives

YEAR 4

Semester 1 (15 credit hours)
HLSC 4850U Current Issues in Health Care
HLSC 4996U Research Applications I or
  HLSC 4998U Research Practicum I
Health or Science elective (3000- or 4000-level)
Elective (3000- or 4000-level)
Elective

Semester 2 (15 credit hours)
HLSC 4620U Quality Improvement in Health Care
HLSC 4997U Research Applications II or
  HLSC 4999U Research Practicum II
Health or Science elective (3000- or 4000-level)
Elective (3000- or 4000-level)
Elective

*Students looking to pursue more science-based courses should take CSCI 1000U Scientific Computing Skills.

13.3.6 Program details – Health Information Management specialization

The growth of information-based decision making, both in clinical care and in planning for delivery systems, has created a demand for timely, accurate, and accessible health data. The specialization in Health Information Management supports the advancement of the discipline through emphasis on use and management of health information systems and databases, information analysis, research, critical thinking and decision making. Graduates of this program qualify to challenge the Canadian Health Information Management Association (CHIMA) national certification examination for a professional credential in Health Information Management.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.healthsciences.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CSCI 1800U Computing Tools for Health Sciences*
HLSC 1200U Anatomy and Physiology I
HLSC 1701U Academic Writing: Perspectives in Health
Elective

Semester 2 (15 credit hours)
BIOL 1020U Biology II
HLSC 1201U Anatomy and Physiology II
PSYC 1000U Introductory Psychology
Two electives

YEAR 2

Semester 1 (15 credit hours)
HLSC 2201U Introduction to Health Information Management
HLSC 2400U Introduction to Movement Neuroscience
HLSC 2462U Altered Physiology: Mechanisms of Disease I
HLSC 2800U Health and Wellness
SOCI 1000U Introduction to Sociology

Semester 2 (15 credit hours)
HLSC 2030U Theory and Practice of Interpersonal Communication
HLSC 2463U Altered Physiology: Mechanisms of Disease II
HLSC 2601U Introduction to Health Management
HLSC 2801U Understanding Health Care and Therapeutics in Canada
HLSC 3800U Critical Appraisal of Statistics in Health Science

YEAR 3

Semester 1 (15 credit hours)
HLSC 3201U Understanding Health Data
HLSC 3212U Fundamentals of Managing Health Information
HLSC 3710U Ethics
HLSC 3805U Introduction to Epidemiology
HLSC 3910U Research Methods for Health Care Professionals: Theory and Application

Semester 2 (15 credit hours)
BUSI 3040U Information Systems
HLSC 3202U Health Data for Decision Making
HLSC 3501U Health Law
HLSC 3601U Interprofessional Health Care Teams
HLSC 3630U Health Finance

YEAR 4

Semester 1 (15 credit hours)
BUSI 2550U Information Technology Project Management
HLSC 4201U Advanced Health Information Management
HLSC 4850U Current Issues in Health Care
HLSC 4996U Research Applications I or
  HLSC 4998U Research Practicum I
Elective

Semester 2 (15 credit hours)
HLSC 4202U Health Information Management Capstone
HLSC 4610U Systems Analysis in Health Care
HLSC 4620U Quality Improvement in Health Care
HLSC 4997U Research Applications II or
  HLSC 4999U Research Practicum II
INFR 3810U Database Systems

*Students looking to pursue more science-based courses should take CSCI 1000U Scientific Computing Skills.

13.3.7 Program details – Kinesiology specialization

- Exercise Science option; and
- Health and Wellness option.

The Kinesiology specialization will be a focused program directed toward understanding the role and application of exercise for rehabilitation and health improvement. Rehabilitation Kinesiology is a discipline within kinesiology whose practitioners prescribe individualized exercise programs to improve or maintain the health, functional capacity and global well-being of a range of clinical populations. The physiological response to exercise is compromised by various disease processes and/or their associated medications and therefore, an exercise prescription must account for this to ensure the efficacy of the program, as well as the safety of the individual.

Graduates of this program and specialization will complete the necessary courses to be eligible to apply for membership with the Ontario Kinesiology Association. Graduates will be prepared to assume positions as kinesiologists both in the health care system and in private practice. Students will also be eligible for admission to professional postgraduate programs in physical therapy, occupational therapy, medicine and chiropractic, as well as academic postgraduate programs.

13.3.8 Degree requirements – Exercise Science option

The Exercise Science option is intended for students wishing to pursue postgraduate study in areas such as exercise physiology, exercise rehabilitation, human neurophysiology or applied bioscience. This option will also prepare students interested in programs such as medicine, occupational and physical therapy, and chiropractic.

In order to be eligible to participate in required laboratory courses in the Kinesiology program, students must meet specific requirements for safe practice in the lab setting. Students will be required to show proof of current basic first aid and CPR certification at the beginning of each academic year starting in second year.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.healthsciences.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1800U Computing Tools for Health Sciences*
HLSC 1200U Anatomy and Physiology I
HLSC 1701U Academic Writing: Perspectives in Health

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
HLSC 1201U Anatomy and Physiology II
PHY 1810U Physics for Health Science
PSYC 1000U Introductory Psychology

YEAR 2

Semester 1 (15 credit hours)
HLSC 2201U Introduction to Health Information Management
HLSC 2400U Introduction to Movement Neuroscience
HLSC 2462U Altered Physiology: Mechanisms of Disease I
HLSC 2800U Health and Wellness
HLSC 3470U Kinesiology I: Anatomy of Human Movement

Semester 2 (15 credit hours)
HLSC 2110U Foundations in Clinical and Exercise Biochemistry
HLSC 2401U Human Growth and Motor Development
HLSC 2463U Altered Physiology: Mechanisms of Disease II
HLSC 3480U Principles of Fitness and Exercise Prescription
HLSC 3800U Critical Appraisal of Statistics in Health Science

YEAR 3

Semester 1 (15 credit hours)
HLSC 3481U Exercise Physiology
HLSC 3710U Ethics
HLSC 3805U Introduction to Epidemiology
HLSC 3910U Research Methods for Health Care Professionals: Theory and Application
HLSC 4471U Kinesiology II: Musculoskeletal Biomechanics

Semester 2 (15 credit hours)
HLSC 2801U Understanding Health Care and Therapeutics in Canada
HLSC 2825U Nutrition and Health
HLSC 3020U Health and Exercise Psychology
HLSC 3410U Human Motor Control and Learning
HLSC 4482U Advanced Exercise Prescription

YEAR 4

Semester 1 (15 credit hours)
HLSC 4412U Exercise Rehabilitation I: Cardiac, Respiratory and Metabolic Conditions
HLSC 4414U Advanced Topics in Neuromuscular Physiology and Pathophysiology
HLSC 4996U Research Applications I or
HLSC 4998U Research Practicum I
Health or Science elective (2000-level or higher)
Kinesiology elective (3000- or 4000-level)

Semester 2 (15 credit hours)
HLSC 4413U Exercise Rehabilitation II: Integrated Case Studies
HLSC 4472U Clinical Biomechanics and Ergonomics
HLSC 4997U Research Applications II or
HLSC 4999U Research Practicum II
Open elective (2000-level or higher)
Kinesiology elective (3000- or 4000-level)

13.3.9 Degree requirements – Health and Wellness option

The Health and Wellness option is intended for students wishing to pursue postgraduate study in community health, as well as those interested in a career in health policy or promotion with a special interest in exercise for health.

In order to be eligible to participate in required laboratory courses in the Kinesiology program, students must meet specific requirements for safe practice in the lab setting. Students will be required to show proof of current basic first aid and CPR certification at the beginning of each academic year starting in second year.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.healthsciences.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CSCI 1800U Computing Tools for Health Sciences*
HLSC 1200U Anatomy and Physiology I
HLSC 1701U Academic Writing: Perspectives in Health
Open elective

Semester 2 (15 credit hours)
HLSC 1201U Anatomy and Physiology II
PHY 1810U Physics for Health Science
PSYC 1000U Introductory Psychology
SOCI 1000U Introductory Sociology
Open elective

YEAR 2

Semester 1 (15 credit hours)
HLSC 2201U Introduction to Health Information Management
HLSC 2400U Introduction to Movement Neuroscience
HLSC 2462U Altered Physiology: Mechanisms of Disease I
HLSC 2800U Health and Wellness
HLSC 3470U Kinesiology I: Anatomy of Human Movement

Semester 2 (15 credit hours)
HLSC 2110U Foundations in Clinical and Exercise Biochemistry
HLSC 2401U Human Growth and Motor Development
HLSC 2463U Altered Physiology: Mechanisms of Disease II
HLSC 3480U Principles of Fitness and Exercise Prescription
HLSC 3800U Critical Appraisal of Statistics in Health Science

YEAR 3

Semester 1 (15 credit hours)
HLSC 3481U Exercise Physiology
HLSC 3710U Ethics
HLSC 3805U Introduction to Epidemiology
HLSC 3910U Research Methods for Health Care Professionals: Theory and Application
HLSC 4471U Kinesiology II: Musculoskeletal Biomechanics

Semester 2 (15 credit hours)
HLSC 2801U Understanding Health Care and Therapeutics in Canada
HLSC 2825U Nutrition and Health
HLSC 3020U Health and Exercise Psychology
HLSC 3410U Human Motor Control and Learning
HLSC 4482U Advanced Exercise Prescription

YEAR 4

Semester 1 (15 credit hours)
HLSC 4412U Exercise Rehabilitation I: Cardiac, Respiratory and Metabolic Conditions
HLSC 4850U Current Issues in Health Care
HLSC 4996U Research Applications I or
    HLSC 4998U Research Practicum I
Health or science elective (2000-level or higher)
Kinesiology elective (3000- or 4000-level)

Semester 2 (15 credit hours)
HLSC 4413U Exercise Rehabilitation II: Integrated Case Studies
HLSC 4460U Selected Topics in Physical Activity and Health
HLSC 4620U Quality Improvement in Health Care
HLSC 4997U Research Applications II or
    HLSC 4999U Research Practicum II
Open elective (2000-level or higher)

13.3.10 Program details – Kinesiology specialization, Fitness and Health Promotion degree completion

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Applicants who meet the full requirements of an Ontario College Fitness and Health Promotion diploma will be eligible for admission to UOIT with a minimum full block transfer of 39 credits (13 courses).

13.4 Program information – Bachelor of Health Science (Honours) in Medical Laboratory Science – BHSc (Hons)

13.4.1 General information

UOIT offers a Bachelor of Health Science (Honours) in Medical Laboratory Science. This degree is the first of its kind in Ontario, and connects students with the most recent advances in modern medical research.

The faculty's mission is to prepare professional Medical Laboratory Science technologists who are committed to excellence and innovation in a rapidly changing allied health environment; to value collaborative learning as a means to develop team oriented workplace skills; to encourage the transition to self-directed learning; and, foster opportunities that build personal accountability, adaptability and transferable skills.

In recent years, modern health care has become increasingly dependent on complex laboratory tests. Medical laboratory technologists perform tests in all laboratory areas. The results of these tests aid in the diagnosis, monitoring and treatment of disease. As a result of the growing and aging population in Canada and impending retirements, the demand for medical laboratory technologists is increasing.

Students learn fundamental knowledge and skills in biological, physical and health sciences. In the medical laboratory science specific courses students develop strong laboratory, interpersonal, analytical and problem solving skills. When in the laboratories, students will work with all types of human specimens. It is important that applicants are aware of this aspect of the program. Throughout years one to four, students will be expected to collect blood specimens. Gaining competence in blood collection is essential to complete prior to entering the first practicum semester in year four.

Medical laboratory professionals are dedicated to serving the health care needs of the public; therefore, the welfare of the patient is paramount at all times. In order to meet this expectation on graduation, it is important that students considering Medical Laboratory Science realize there is an expectation throughout the program that they perform testing protocols within a pre-established time standard and meet the Canadian Society for Medical Laboratory Science competencies so that they are prepared for the clinical environment.

Applicants with colour blindness should be aware that the ability to clearly differentiate colours is essential for working in a diagnostic medical laboratory.

13.4.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a minimum grade of 60 per cent, Advanced Functions (MHF4U), and two of Biology (SBI4U), Calculus and Vectors (MCV4U), Chemistry (SCH4U), or Physics (SPH4U). In addition, a combined minimum 70 per cent average in math and science courses is required. It is recommended that all three of SBI4U, MCV4U, and SCH4U be taken. All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

13.4.3 Practicum

Starting in first year, students will have the opportunity to apply their knowledge and get hands-on experience in the simulation laboratories. As the theoretical knowledge expands so does experiential knowledge. In fourth year, students will be placed in a diagnostic medical laboratory for the final two practicum semesters where they will work under the supervision of a medical laboratory technologist and perform increasingly complex procedures on human specimens. Clinical placements give students hands-on practice, experience in different work environments and the opportunity to network with potential employers.

Prior to entering the first practicum semester, students will be expected to update their immunizations and Tuberculosis test. A completed Canadian Police Information Centre (CPIC) check must also be submitted.

The Medical Laboratory Science program is affiliated with laboratories throughout the province of Ontario. Many of these laboratories are considered multi-site, which means the five departments that comprise the diagnostic laboratory are shared between two or three sites that are located kilometres apart. As assignment to a practicum site is random, students must be prepared to relocate and assume the costs associated with this relocation and travel between multi-site locations.

13.4.4 Careers

The employment outlook for medical laboratory technologists is expected to grow more than the average for all occupations in the coming years, with approximately 50,000 additional jobs opening up in North America during the next decade. Graduates of this program will have the skills needed to work in a variety of practice settings, including hospital and private laboratories, administrative and/or policy development positions in hospitals, LINS and government, reagent, instrument and pharmaceutical companies, public health laboratories, environmental testing and monitoring facilities, and more. They may also choose a career in medical research or pursue graduate studies.

13.4.5 Professional qualifications

Following satisfactory completion of the degree program, graduates are eligible to write the examinations offered by the Canadian Society for Medical Laboratory Science (CSMLS) to obtain national certification. CSMLS certification is recognized throughout Canada. For those graduates that choose to remain in Ontario to practice, successful completion of the CSMLS examination allows graduates to register with the College of Medical Laboratory Technologists of Ontario (CMLTO) which governs license to practice in Ontario.

13.4.6 Degree requirements

To be eligible for the BHSc (Hons) degree, students must successfully complete 120 credit hours. Degree and program requirements are subject to change without notice. The following program map is only a guide and is to be used in combination with proper advising. Students wishing to make changes to their program of study should consult their academic advisor. For course descriptions, see Section 16.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.healthsciences.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
HLSC 1200U Anatomy and Physiology I
HLSC 1701U Academic Writing: Perspectives in Health
Open elective*

Semester 2 (15 credit hours)
CHEM 1020U Chemistry II
HLSC 1201U Anatomy and Physiology II
HLSC 2110U Foundations in Clinical and Exercise Biochemistry
HLSC 2030U Theory & Practice of Interpersonal Communication
MATH 1880U Mathematical Modelling for Health Science

YEAR 2

Semester 1 (15 credit hours)
CHEM 2130U Analytical Chemistry for Biosciences
HLSC 2460U Pathophysiology I
HLSC 3800U Critical Appraisal of Statistics in Health Science
MLSC 1010U Introduction to Medical Laboratory Practice
MLSC 2130U Foundations in Clinical Microbiology and Immunology

Semester 2 (15 credit hours)
HLSC 2461U Pathophysiology II
HLSC 3910U Research Methods for Health Care Professionals: Theory and Application
MLSC 2111U Clinical Biochemistry I
MLSC 2121U Clinical Hematology I
MLSC 2131U Clinical Microbiology I

YEAR 3

Semester 1 (15 credit hours)
MLSC 3111U Clinical Biochemistry II
MLSC 3121U Clinical Hematology II
MLSC 3131U Clinical Microbiology II
MLSC 3221U Transfusion Immunology and Hemostasis
MLSC 3230U Microanatomy and Histotechnology

Semester 2 (15 credit hours)
HLSC 3601U Interprofessional Health Care Teams
HLSC 3710U Ethics
MLSC 3210U Practice of Effective Leadership, Quality Management and Professionalism in Clinical Laboratory
MLSC 3220U Transfusion Science
MLSC 3300U Simulated Clinical Practicum

YEAR 4

Semester 1 (15 credit hours)
MLSC 4300U Clinical Practicum I
MLSC 4400U Clinical Theory and Project I
Open elective

Semester 2 (15 credit hours)
MLSC 4301U Clinical Practicum II
MLSC 4401U Clinical Theory and Project II
Open elective

*CSCI 1000U Scientific Computing Tools or CSCI 1800U Computing Tools for Health Science is recommended for this elective.

13.4.7 Program progression requirements

A student must achieve a minimum of grade C, or for those courses graded as pass/fail, a pass in all professional medical laboratory science courses (designated MLSC) in order to pass the course. Students who earn a grade lower than a C, or a fail, in any of the courses designated MLSC will be given a standing of program probation, regardless of their overall GPA.

A second consecutive grade of less than C, or fail, in a repeated professional medical laboratory science course (designated MLSC) will result in a withdrawn standing and removal from the medical laboratory science program.

A third failing grade in any of the program required courses, which would include:

a) a grade less than C or a fail in a MLSC designated course and/or
b) a grade of F in any HLSC required course outlined in the program map;

will result in a withdrawal from the medical laboratory science program.

Students who are withdrawn from the program, but have maintained the academic standing to remain at the university may apply for a program transfer.

13.4.8 Program progression appeal

Students may, with sufficient grounds, request an appeal within the statute of the program progression requirements. The process will follow the Appeal of Academic Standing policy as laid out in Section 5 of this calendar.

13.4.9 Program readmission

See Section 4.5.9.

13.4.10 Program professional unsuitability

At any point during the academic term, the Faculty of Health Sciences reserves the right to terminate a student's experience in a practice setting when a student exhibits behaviour that is inconsistent with the norms and expectations of the profession, or that places the student, patients, or staff at risk. This action will result in the student receiving a fail grade (FAL) for the course. In this circumstance, students shall have the established rights of appeal; however, they cannot remain in the course while the appeal is underway. The appeal will be conducted promptly in order to protect the student's rights.

13.5 Program information – Bachelor of Science in Nursing (Honours) – BScN (Hons)

13.5.1 General information

The Faculty of Health Sciences, in collaboration with Durham College, offers an Honours Bachelor of Science in Nursing. The faculty's mission is to prepare professional nurses who are committed to excellence and innovation in assessing and meeting the nursing needs of society and to develop and transmit knowledge regarding nursing practice and the human experience of health, illness and healing.

This fully integrated partnership provides collaborative learning activities, in which students take an active role in their own learning. This learning strategy combined with traditional methods prepares students for life-long learning, research, teamwork and leadership skills essential for nursing practice. The state-of-the-art nursing labs provide students with practical, hands-on experience in hospital and home-care setting with the latest technology right at their fingertips.

Nurses are dedicated to serving the health care needs of the public; therefore, obtaining the best possible outcome for the patient is paramount at all times. In order to meet this expectation on graduation, it is important that applicants considering Nursing (BScN) realize there is an expectation throughout the program that they perform competencies that meet the Standards of Practice of the College of Nurses of Ontario, so that they are prepared for the clinical environment.

13.5.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a minimum 60 per cent, Biology (SBI4U), Chemistry (SCH4U), and one of Advanced Functions (MHF4U), Calculus and Vectors (MCV4U), or Mathematics of Data Management (MDM4U). A minimum of 65 per cent in MHF4U, MCV4U or MDM4U is recommended. Admission preference will be given to students presenting Advanced Functions (MHF4U) or Calculus and Vectors (MCV4U). All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

13.5.3 Practicum

Students begin their hands-on experience in first year using the state-of-the-art nursing lab. Starting in their second term, students will be out in a clinical setting learning from practicing professionals. Over fifty employers from the health sector provide practicum experience and supervision.

13.5.4 Careers

There is no better time to choose a rewarding career in nursing. Projections continue to show that the province of Ontario faces a shortfall of registered nurses. There are abundant and varied employment opportunities for nursing graduates in a variety of venues, including hospitals, long-term care facilities, community service organizations and health centres.

13.5.5 Professional qualifications

Graduates are prepared to write the Canadian Registered Nurse examination through the Canadian Nurses Association (CNA) to become a registered nurse. Individuals must comply with the registration requirements of the College of Nurses of Ontario (CNO). Students applying to the program should review the legislation for individuals requesting registration. For more information on how this new legislation may impact you, call the CNO at 1.800.387.5526 or visit **www.cno.org** for clarification.

13.5.6 Degree requirements

To be eligible for the BScN (Hons) degree, students must successfully complete 120 credit hours. Degree and program requirements are subject to change without notice.

The following program map is only a guide and is to be used in combination with proper advising. Students wishing to make changes to their program of study should consult their academic advisor.

Students must achieve a minimum grade of C in all nursing courses (identified by the subject code NURS) to be eligible for the degree. For course descriptions, see Section 16.

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.healthsciences.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
HLSC 1200U Anatomy and Physiology I
HLSC 1300U Information and Communication Technology in Health Care
NURS 1002U Introduction to Nursing Praxis
NURS 1003U Foundations for Nursing Practicum I
NURS 1100U Introduction to Health and Healing
NURS 1420U Development of Self as a Nurse I

Semester 2 (15 credit hours)
HLSC 1201U Anatomy and Physiology II
NURS 1503U Foundations for Nursing Practicum II
NURS 1700U Health and Healing: Older Adult Nursing Theory and Practicum
NURS 2320U Health Assessment
SOCI 1000U Introductory Sociology

YEAR 2

Semester 1 (15 credit hours)
HLSC 2460U Pathophysiology I
NURS 2420U Knowing Through Inquiry
NURS 2700U Health and Healing: Child and Family Nursing Theory and Practicum or
NURS 2701U Health and Healing: Adult Health Challenges Nursing Theory and Practicum*
NURS 2810U Pharmacology for Nurses

Semester 2 (15 credit hours)
BIOL 2830U Microbiology for Health Science
HLSC 2461U Pathophysiology II
HLSC 2820U Nutrition for Nursing Practice
NURS 2700U Health and Healing: Child and Family Nursing Theory and Practicum or
NURS 2701U Health and Healing: Adult Health Challenges Nursing Theory and Practicum*

*Students must complete both NURS 2700U and NURS 2701U to meet degree requirements.

YEAR 3

Semester 1 (15 credit hours)
HLSC 3710U Ethics
HLSC 3800U Critical Appraisal of Statistics for Health Science
NURS 3700U Health and Healing: Healthy Communities Nursing Theory and Practicum or
NURS 3701U Health and Healing: Mental Health Nursing Theory and Practicum **
PSYC 1000U Introductory Psychology

Semester 2 (15 credit hours)
HLSC 3601U Interprofessional Health Care Teams
HLSC 3910U Research
NURS 3700U Health and Healing: Healthy Communities Nursing Theory and Practicum or
NURS 3701U Health and Healing: Mental Health Nursing Theory and Practicum **
PSYC 2010U Developmental Psychology

**Students must complete both NURS 3700U and NURS 3701U to meet degree requirements.

YEAR 4

Semester 1 (15 credit hours)
NURS 4100U Nursing Leadership
NURS 4700U Health and Healing: Synthesis Professional Practice
Two electives

Semester 2 (15 credit hours)
NURS 4505U Nursing Professional Practice VIII
Two electives

13.5.7 Program progression requirements

A student must achieve a minimum grade of C in all professional nursing courses (NURS) in order to pass the course.

Students who earn a grade lower than a C in any of the courses designated NURS will be given a standing of program probation, regardless of their overall GPA. A second grade of less than C in a repeated professional nursing (NURS) course will result in withdrawal from the Nursing program.

A second grade of less than C in any repeated or subsequent theory and practicum course including NURS 1700U, NURS 2700U, NURS 2701U, NURS 2705U, NURS 3700U, NURS 3701U, NURS 4505U and NURS 4700U will also result in a withdrawal from the Nursing program.

Additionally, a third failing grade in any of the program required courses, which would include:

a) a grade less than C in a NURS designated theory and practicum course and/or
b) a grade of F in any HLSC required course outlined on the program map

will result in a withdrawal from the Nursing program.

Students who are withdrawn from the program, but have maintained the academic standing to remain at the university may apply for a program transfer.

13.5.8 Program progression appeal

Students may, with sufficient grounds, request an appeal within the statute of the program progression requirements. The process will follow the Appeal of Academic Standing policy as laid out in Section 5 of this calendar.

13.5.9 Program readmission

See Section 4.5.9.

13.5.10 Program professional suitability

Safety of students and patients in placement settings is of paramount importance for the Nursing program and for the clinical setting. The following requirements are in place to ensure the provision of competent, safe and ethical nursing care while students are on placement in a clinical setting.

13.5.10.1 Requirements for safe practice

In order to be eligible to participate in placement, students will be required to meet specific requirements for safe practice within established timelines as stated in the BScN Practicum Handbook. These requirements include the successful completion of mathematics and practicum assessments, health and safety requirements, and a criminal reference check. Students who do not successfully meet the requirements for safe practice will not be approved to participate in their practicum placement and will be required to withdraw from their respective NURS Theory and Practicum course until the next time the course is offered, the requirements are met and a placement site is available.

13.5.10.2 Clinical review

A student in practicum placement who has exhibited behaviour that is inconsistent with the norms and expectations of the profession, or that places the student, clients or others at risk, may be immediately suspended from the program and subject to a review and possible sanctions, in accordance with Section 5.15 of the Academic Calendar.

13.5.10.3 Clinical evaluation appeal

A student who receives a failing grade in the practicum component of a NURS Theory and Practicum course may request a clinical evaluation appeal (which will comprise a review of all documentation related to their placement).

Students are normally expected to contact their Year Coordinator first to discuss their evaluation and seek an informal resolution. If the concern is not resolved, he or she may request a clinical evaluation appeal. The student shall lodge the appeal with the Faculty Dean, specifying the rationale for their appeal and making clear the components to be re-evaluated. The deadline for requesting a clinical evaluation appeal is the last day of the final examination period or three weeks after the final review meeting, whichever is later.

The appeal will be reviewed by a clinical evaluation appeal committee comprised of the dean's delegate and two members of the academic staff. In reviewing the appeal, the committee shall meet with the student, who is entitled to be accompanied by a campus advisor at this meeting, provided 48 hours advanced notice is given as to the identity of the advisor. The committee may also meet with the faculty or clinical instructors involved in the assessment. The committee will then conduct a thorough review of the appeal and recommend a resolution to the dean. The dean will notify the student of the decision in writing. It is expected that every effort will be made to render the decision within 30 days of the committee having received the appeal.

13.6 Post-RPN – BScN (Hons) Bridge program

13.6.1 General information

The RPN – BScN Bridge program is modelled on UOIT and Durham College's innovative Collaborative Nursing program. The post-diploma BScN program for registered practical nurses provides RPNs with enriched knowledge in the sciences, nursing, and other disciplines. The program will utilize the latest in learning technologies to enhance access for working professionals. The program can also be completed on a part-time basis at the UOIT campus.

13.6.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Students seeking admission to the RPN to BScN Bridge program must be graduates from an approved practical nursing Ontario College diploma program (or equivalent). Preference will be given to applicants who have achieved at least a GPA of 2.7.

Applicants must hold a current Certificate of Competence from the College of Nurses of Ontario (CNO). Qualified students must successfully complete three bridge courses: HLSC 0880U, HLSC 1300U, and NURS 0420U, each with a GPA of 2.0 (on a 4.3 scale) or higher prior to acceptance into the RPN to BScN degree program. Students will be restricted to the above courses with a maximum course load of 9 credit hours in their first semester.

13.6.3 Post-RPN degree requirements

1. BScN 120 credits including:

   a) Transfer credit hours for completion of a Practical Nursing Diploma and current Certificate of Competence as a Registered Practical Nurse from the College of Nurses of Ontario.

   b) Major requirements – 75 credit hours including:

   - BIOL 2830U Microbiology for Health Science;
   - HLSC 0880U Science Bridge;
   - HLSC 1300U Information and Communication Technology in Health Care;
   - HLSC 2202U Comprehensive Anatomy and Physiology;
   - HLSC 2460U Pathophysiology I;
   - HLSC 2461U Pathophysiology II;
   - HLSC 2820U Nutrition for Nursing Practice;
   - HLSC 3601U Interprofessional Health Care Teams;
   - HLSC 3710U Ethics;
   - HLSC 3800U Critical Appraisal of Statistics in Health Science;
   - HLSC 3910U Research Methods for Health Care Professionals: Theory and Application;
   - PSYC 2010U Developmental Psychology;
   - NURS 0420U Professional Nursing – Bridging;
   - NURS 2420U Knowing Through Inquiry;
   - NURS 2705U Health and Healing: Child and Family Nursing Theory and Practicum (RPN to BScN);
   - NURS 2820U Comprehensive Pharmacotherapeutics;
   - NURS 3700U Health and Healing: Health Communities Nursing Theory and Practicum;
   - NURS 4100U Nursing Leadership;
   - NURS 4505U Professional Practice VIII; and
   - NURS 4700U Health and Healing: Synthesis Professional Practice.

   c) Elective requirements: 12 credit hours outside major at any level.

2. Residency requirement: up to an additional 15 credit hours of advance standing may be granted based on a student's previous university experience. Half the degree credits must be taken through UOIT.

13.6.4 Progression requirements

Please refer to the progression requirements for the collaborative BScN program (sections 13.5.7 through 13.5.10).

SECTION 14: FACULTY OF SCIENCE

Dean: William Smith, BASc, MASc, MSc, PhD, PEng

Professors:

Mark Green, BSc, MSc, PhD

Douglas Holdway, BSc (Hons), MSc, PhD

Associate professors:

Dhavide Aruliah, BSc (Hons), MSc, PhD

Peter Berg, MSc, PhD

Dario Bonetta, BSc, MSc, PhD

Luciano Buono, BSc, MSc, PhD

Anatoli Chkrebtii, MSc, PhD

Shari Forbes, BSc, PhD

Sean Forrester, BSc, MSc, PhD

Julia Green-Johnson, BSc (Hons), MSc, PhD

Holly Jones-Taggart, BSc (Hons), PhD

Greg Lewis, BSc (Hons), MSc, PhD

Fedor Naumkin, MSc, PhD

Assistant professors:

Sean Bohun, BSc, MSc, PhD

Jeremy Bradbury, BSc, MSc, PhD

Christopher Collins, BSc, MSc, PhD

Jean-Paul Desaulniers, BSc, PhD

Brad Easton, BSc (Hons), PhD

Franco Gaspari, BSc, MSc, PhD

Andrea Kirkwood, BES, MSc, PhD

Hélène Leblanc, BSc (Hons), MSc, PhD

Krisztina Paal, BSc, PhD

Ken Pu, BASc, MASc, PhD

Faisal Qureshi, BSc, MSc, PhD

Janice Strap, BSc, MSc, PhD

Liliana Trevani, BChem, PhD

Lennaert van Veen, PhD

Lecturers:

Rupinder Brar, BSc (Hons), MSc, PhD

Cristen Hucaluk, BSc, MSc

Paula Di Cato, BA (Hons), BSc, MSc

Senior laboratory instructors:

Sylvie Bardin, BSc, MSc, PhD

Richard Bartholomew, BSc (Hons), MSc, PhD

Kevin Coulter, BSc, PhD

Christopher Garside, BSc, MSc, PhD

Valeri Kapoustine, MSc, PhD

Ilona Kletskin, BSc (Hons), BEd, MSc

Kimberly Nugent, BSc, MSc

Senior academic advisor:

Sarah Innes, BJ (Hons)

Academic advisor:

T.B.D.

www.science.uoit.ca

14.1 Degrees offered

Bachelor of Science (Honours) in Applied and Industrial Mathematics – BSc (Hons)

Bachelor of Science (Honours) in Applied and Industrial Mathematics (Co-op option) – BSc (Hons), Co-operative Education

Bachelor of Science (Honours) in Biological Science – BSc (Hons)

- Complementary Studies;
- Environmental Toxicology specialization;
- Life Sciences specialization; and
- Pharmaceutical Biotechnology specialization.

Bachelor of Science (Honours) in Biological Science (Co-op option) – BSc (Hons), Co-operative Education

- Complementary Studies;
- Environmental Toxicology specialization;
- Life Sciences specialization; and
- Pharmaceutical Biotechnology specialization.

Bachelor of Science (Honours) in Chemistry – BSc (Hons)

- Chemistry Comprehensive program;
- Biological Chemistry specialization; and
- Pharmaceutical Chemistry specialization.

Bachelor of Science (Honours) in Chemistry (Co-op option) – BSc (Hons), Co-operative Education

- Chemistry Comprehensive program;
- Biological Chemistry specialization; and
- Pharmaceutical Chemistry specialization.

Bachelor of Science (Honours) in Computing Science – BSc (Hons)

- Computing Science Comprehensive program;
- Digital Forensics specialization; and
- Digital Media specialization.

Bachelor of Science (Honours) in Computing Science (Co-op option) – BSc (Hons), Co-operative Education

- Computing Science Comprehensive program;
- Digital Forensics specialization; and
- Digital Media specialization.

Bachelor of Science (Honours) in Forensic Science – BSc (Hons)

Bachelor of Science (Honours) in Physical Science – BSc (Hons)

Bachelor of Science (Honours) in Physical Science (Co-op option) – BSc (Hons), Co-operative Education

Bachelor of Science (Honours) in Physics – BSc (Hons)

- Physics Comprehensive program;
- Energy and the Environment specialization;
- Forensic Physics specialization; and
- Medical Physics specialization.

Bachelor of Science (Honours) in Physics (Co-op option) – BSc (Hons), Co-operative Education

- Physics Comprehensive program;
- Energy and the Environment specialization;
- Forensic Physics specialization; and
- Medical Physics specialization.

Bachelor of Science and Management (Honours) in Biological Science and Management – BSc and Mgt (Hons)

- Complementary Studies;
- Environmental Toxicology specialization;
- Life Sciences specialization; and
- Pharmaceutical Biotechnology specialization.

Bachelor of Science and Management (Honours) in Biological Science and Management (Co-op option) – BSc and Mgt (Hons, Co-operative Education)

- Complementary Studies;
- Environmental Toxicology specialization;
- Life Sciences specialization; and
- Pharmaceutical Biotechnology specialization.

Bachelor of Science and Management (Honours) in Physical Science and Management – BSc and Mgt (Hons)

Bachelor of Science and Management (Honours) in Physical Science and Management (Co-op option) – BSc and Mgt (Hons), Co-operative Education

Bachelor of Science (Honours)/Bachelor of Education (Intermediate/Senior) – BSc (Hons)/BEd (Concurrent)

Bachelor of Science (Honours)/Bachelor of Education (Intermediate/Senior) (Co-op option) – BSc (Hons)/BEd (Concurrent), Co-operative Education

The Faculty of Science offers students a variety of four-year degree programs in science. A combined five-year program in Concurrent Education (BSc (Hons) and BEd) is offered in collaboration with the Faculty of Education. These programs are highly focused on subjects relevant to emerging areas of science knowledge and practice. The Biological Science program provides three innovative specializations, Environmental Toxicology, Life Sciences, and Pharmaceutical Biotechnology. In the Chemistry program, students can choose to pursue a comprehensive Chemistry degree or major in Biological Chemistry or Pharmaceutical Chemistry. Specializations in Energy and the Environment, Forensic Physics, and Medical Physics are also available in addition to a Comprehensive degree in Physics. A Bachelor of Science (Honours) degree in Computing Science, with specializations in Digital Media and Digital Forensics, as well as a Bachelor of Science (Honours) in Forensic Science are offered in the Faculty of Science at UOIT. In addition, students will be able to work with an advisor to customize a program to match their interests and career plans by selecting Complementary Studies in Biological Science, or by choosing the Physical Science degree. In all programs, minors are also available in Biology, Chemistry, Mathematics, Physics and Computational Science.

In keeping with the university's mission to prepare students for careers, our science programs emphasize the development of leadership skills. The university offers students the opportunity to earn a Bachelor of Science and Management (Honours) degree in either the Biological Science or Physical Science programs. This five-year degree provides students with an opportunity to combine their interests in science with business management skills.

In addition, these academic programs in the Faculty of Science include the opportunity for experiential learning. Co-operative education (or co-op) provides up to twenty months of career-related experience, making the academic programs richer and more meaningful. Co-op not only develops intellectual growth through the application of theoretical principles learned in the classroom to real world problems, but also enhances personal growth by helping students to develop the knowledge, perspective, and confidence to transform their lives.

In order to further opportunities for students and research, the Faculty of Science maintains strong links with other faculties in the university, in particular Education, Health Sciences and Engineering.

Master of Science (MSc) programs in Applied Bioscience, Computer Science, Materials Science, and Modelling and Computational Science and PhD programs in Applied Bioscience and Computer Science are offered at UOIT. More information regarding graduate programs at UOIT is available online at **www.gradstudies.uoit.ca**.

14.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U), Advanced Functions (MHF4U), and two of Biology (SBI4U), Calculus and Vectors (MCV4U), Chemistry (SCH4U), or Physics (SPH4U). In addition, a combined minimum 70 per cent average in math and science courses is required. It is recommended that all four MCV4U, SBI4U, SCH4U and SPH4U be taken. All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

There are additional requirements for the Concurrent Education programs. For details, please see Section 14.12.2 or Section 10.3.2 (Faculty of Education) of this calendar.

14.3 Co-operative education and experiential learning

The Faculty of Science offers an optional co-operative education program to students in Applied and Industrial Mathematics, Biological Science, Chemistry, Computing Science, Physical Science, Physics, Biological Science and Management, and Physical Science and Management. Eligible students in the Forensic Science program have the opportunity for academically-related work experience in a fourth year Thesis Project under the supervision of a faculty member or with a forensic professional in an external forensic agency.

As defined by the Canadian Association For Co-operative Education (CAFCE), co-operative education is a sequential pattern of academic terms and co-op work terms in which academic studies are integrated with paid, career-related work experience with relevant companies and agencies. Co-operative education provides many benefits to students including the opportunity to gain valuable practical experience, to earn competitive salaries that partially offset the cost of their education, to help clarify career objectives, and to develop valuable networking that will enhance opportunities for full-time employment upon graduation. Studies have shown that students in the same academic program who graduate from a co-operative education stream have lower debt loads and are employed faster and with higher starting salaries than those who graduate from the regular stream.

In the fall of Year 2, interested students apply to the Faculty of Science and are accepted based on their Year 1 grade point average, their academic status, and having no record of misconduct. While the Faculty of Science cannot guarantee a co-op placement, assistance, advice, and counselling is provided to all students in co-operative education.

Beginning after Year 2 of their academic program, eligible students have the opportunity to integrate their academic studies with up to 20 months of relevant experience in a pattern shown in the following table.

S1 = Semester 1 (Fall)
S2 = Semester 2 (Winter)
S3 = Semester 3 (Spring/Summer)

1st to 8th = Study term
C1 to C5 = Co-op work term

YEAR 1			YEAR 2			YEAR 3			YEAR 4			YEAR 5	
S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2
1st	2nd		3rd	4th	C1	5th	C2	C3	C4	6th	C5	7th	8th

Each co-op work term is assessed by a faculty advisor on the basis of the student's work term report and an employer valuation. Co-op work terms are graded on a pass/fail basis. Please note that four work terms are required in order to satisfy the co-op degree requirements.

Students will have opportunities to undertake research inside or outside the university. Please consult **www.science.uoit.ca** for details.

14.4 Program information – Bachelor of Science (Honours) in Applied and Industrial Mathematics – Regular program and Co-operative Education program

14.4.1 General information

Mathematics is a fundamental component within every aspect of scientific endeavour and underlies much of our daily activities. Mathematics is a key component of problem solving, from the modelling of atmospheric physics to the complexities of managing risk in financial markets.

Students in the Applied and Industrial Mathematics program will learn concepts, principles, qualitative and quantitative methods, as well as innovative problem solving skills. Students will gain valuable experience by learning state-of-the-art algorithms and software in courses and by means of research projects related to the workplace.

Mathematics graduates need to be able to apply relevant advanced numerical skills, including statistical analysis of data, modelling of physical or biological phenomena, and computer implementation of algorithms related to their eventual employment. These abilities will be developed in the mathematics courses offered in the upper years. Exposure to the distinctive assumptions and modes of analysis of other disciplines will be provided in the non-science electives available in each year of the program.

The curriculum also provides a basic foundation in chemistry, physics, and computing science, providing settings within which to apply the mathematical concepts and expertise acquired in the program; students are particularly encouraged to explore a deeper understanding of one of these disciplines by means of a minor program of study.

The emphasis on Applied and Industrial Mathematics is reflected in the wide range of courses focused on the applications of mathematics (e.g., Differential Equations, Mathematical Modelling, Optimization, Computational Science, Partial Differential Equations, and Industrial Mathematics).

The Faculty of Science offers separate Honours BSc degrees in Applied and Industrial Mathematics and in Physics. Students with interest in both disciplines may wish to complete the academic requirements of both programs and be awarded a single degree, BSc (Honours) in Applied and Industrial Mathematics and Physics. Eligibility requirements and academic information can be obtained from the academic advisor.

14.4.2 Admission requirements

See Section 14.2.

14.4.3 Careers

There are many opportunities for graduates holding an undergraduate degree in Applied and Industrial Mathematics, whether they choose to continue on to higher education, or go directly into the workplace. Some of the options include: financial services (banking and financial sector), insurance companies (actuary, analyst), government agencies (Statistics Canada, Defence Department), computer software industry, communications technology companies, consulting firms, high school teacher (UOIT's Consecutive Education program), post-degree studies (law school, medical school), and graduate studies.

Graduates of our program will be fully qualified to be admitted to graduate studies in any reputable applied mathematics program worldwide.

Moreover, since many of the basic core topics for a comprehensive pure mathematics education are also covered in the program, the students' knowledge will be sufficiently broad as to also allow them admission into a pure mathematics graduate program.

14.4.4 Program details and degree requirements – Bachelor of Science (Honours) in Applied and Industrial Mathematics

In addition to the regular program, an optional co-operative education program is available to students in Applied and Industrial Mathematics (see Section 14.3 for co-op program details).

The requirements for the regular and co-operative education programs are detailed in the following program maps. Although reasonable efforts will be made to adhere to the following program maps, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.science.uoit.ca**.

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1030U Introduction to Computer Science with C++
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II or
CHEM 1020U Chemistry II
MATH 1020U Calculus II
MATH 2050U Linear Algebra
PHY 1020U Physics II
Elective**

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
MATH 2010U Calculus III
MATH 2080U Discrete Mathematics
STAT 2010U Statistics and Probability for Physical Science
Elective**

Semester 2 (15 credit hours)
MATH 2020U Calculus IV
MATH 2060U Differential Equations
MATH 2072U Computational Science I
Two electives **

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
MATH 2010U Calculus III
MATH 2080U Discrete Mathematics
STAT 2010U Statistics and Probability for Physical Science
Elective**

Semester 2 (15 credit hours)
MATH 2020U Calculus IV
MATH 2060U Differential Equations
MATH 2072U Computational Science I
Two electives **

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Regular program

Semester 1 (15 credit hours)
MATH 3020U Real Analysis
MATH 3040U Optimization
MATH 3050U Mathematical Modelling
Two electives **

Semester 2 (15 credit hours)
MATH 3060U Complex Analysis
MATH 3070U Algebraic Structures
MATH 4020U Computational Science II
PHY 3040U Mathematical Physics
Elective**

YEAR 4 – Regular program

Semester 1 (15 credit hours)
MATH 4010U Dynamical Systems and Chaos
MATH 4050U Partial Differential Equations
MATH 4410U Mathematics Thesis Project I***
or Senior Science elective**
Two electives **

Semester 2 (15 credit hours)
MATH 4030U Applied Functional Analysis
MATH 4041U Topics in Applied Mathematics
MATH 4060U Industrial Mathematics
MATH 4420U Mathematics Thesis Project II***
or Senior Science elective**
Elective**

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
MATH 3020U Real Analysis
MATH 3040U Optimization
MATH 3050U Mathematical Modelling
Two electives **

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
MATH 3060U Complex Analysis
MATH 3070U Algebraic Structures
MATH 4020U Computational Science II
PHY 3040U Mathematical Physics
Elective**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
MATH 4010U Dynamical Systems and Chaos
MATH 4050U Partial Differential Equations
MATH 4410U Mathematics Thesis Project I***
or Senior Science elective**
Two electives **

Semester 2 (15 credit hours)
MATH 4030U Applied Functional Analysis
MATH 4041U Topics in Applied Mathematics I
MATH 4060U Industrial Mathematics
MATH 4420U Mathematics Thesis Project II***
or Senior Science elective**
Elective**

Notes:

No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete 30 elective credit hours. Students not accepted to take MATH 4410U and MATH 4420U must take an additional two senior science electives for a total of 36 elective credit hours. At least 12 elective credit hours must be in science courses offered by the Faculty of Science. The additional two senior science electives, if taken in place of MATH 4410U and MATH 4420U, cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in mathematics (MATH) courses; at least 12 elective credit hours must be in courses outside the Faculty of Science.

*****Thesis project or senior science elective courses**
Students in clear academic standing who have completed 90 credit hours of their MATH program and five third-year required courses may optionally apply to take a two-course sequence consisting of MATH 4410U and MATH 4420U (Thesis Project in Mathematics I and II). Students not accepted to take the thesis courses must complete two additional senior science electives instead. A senior science elective is defined as any 3000- or 4000-level science course not specified in the program map, excluding SCIE and ENVS courses. A student meeting the above requirements who does not take MATH 4410U and MATH 4420U may optionally apply to take MATH 4430U (Directed Studies in Mathematics) as one of the required senior science electives. Opportunities for the Thesis Project and Directed Studies options are limited; for either of these options, students must apply through Science Advising by April 30 following completion of the first three years of the program.

Recommended senior science electives that students in the Applied and Industrial Mathematics program may choose to take include:

CSCI 3010U Simulation and Modelling
CSCI 3070U Analysis and Design of Algorithms
CSCI 3090U Scientific Visualization and Computer Graphics
PHY 3020U Quantum Mechanics I
PHY 3050U Waves and Optics
PHY 3060U Fluid Mechanics
STAT 3010U Biostatistics

14.5 Program information – Bachelor of Science (Honours) in Biological Science – Regular program and Co-operative Education program

14.5.1 General information

As students proceed through the Biological Science program, they will obtain a background in cell biology, genetics and molecular biology, physiology, biochemistry and developmental biology. Senior level courses such as Bioethics, Neuroscience, Functional Genomics and Proteomics, along with access to modern laboratories, computational tools, sophisticated equipment and state-of-the-art facilities will enable advanced research work and skills training in industry best practice and in research.

The Biological Science program offers specializations in Life Sciences, Environmental Toxicology, and Pharmaceutical Biotechnology, as well as an unspecialized Biology degree (Complementary Studies).

14.5.2 Admission requirements

See Section 14.2.

14.5.3 Careers

Graduates in these areas are in high demand. The Life Sciences specialization prepares students for careers dealing with medicine, research labs and industry. The Environmental Toxicology specialization prepares students for careers dealing with environmental issues in industry and government, and as consultants in the private sector. The Pharmaceutical Biotechnology specialization prepares students to work in research and development in the rapidly growing pharmaceutical and biotechnology industries, as well as in government agencies.

14.5.4 Program details and degree requirements – Bachelor of Science (Honours) in Biological Science

Students interested in the three primary specializations (Pharmaceutical Biotechnology, Environmental Toxicology, or Life Sciences) will follow specified program maps, which prescribe the sequence of courses.

Students taking Complementary Studies will work with the science academic advisor to customize a Biological Science program to match their interests and career plans. Students wishing to follow the co-op program with the unspecialized degree should seek academic advising early in their second year.

In addition to the regular program, an optional co-operative education program is available to students in Biological Science including Complementary Studies, Environmental Toxicology, Life Sciences, and Pharmaceutical Biotechnology (see Section 14.3 for co-op program details).

The requirements for the regular and co-operative education programs are detailed in the following program maps. Although reasonable efforts will be made to adhere to the following program maps, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.science.uoit.ca**.

14.5.4.1 Biological Science – Complementary Studies

Students must successfully complete 120 credit hours according to the following requirements:

First-year required science courses – 27 credit hours
- BIOL 1010U Biology I and BIOL 1020U Biology II;
- CHEM 1010U Chemistry I and CHEM 1020U Chemistry II;
- CSCI 1000U Scientific Computing Tools;
- MATH 1000U Introductory Calculus or MATH 1010U Calculus I, and MATH 1020U Calculus II+; and
- PHY 1010U Physics I or PHY 1030U Introductory Physics, and PHY 1040U Physics for Biosciences++.

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

++Students who wish to take upper-year physics courses must take PHY 1010U or PHY 1030U and PHY 1020U. However, students who achieve a B standing or higher in PHY 1040U will be permitted to proceed to higher-level physics courses.

Additional core courses – 21 credit hours in biological science
- BIOL 2010U Introductory Physiology;
- BIOL 2020U Genetics and Molecular Biology;
- BIOL 2030U Cell Biology;
- BIOL 2080U Biochemistry I;
- BIOL 2060U Introduction to Microbiology and Immunology;
- BIOL 3050U Developmental Biology; and
- BIOL 3080U Biochemistry II.

Upper-year specialization – 21 credit hours in biological science
All students must successfully complete at least 21 credit hours in additional courses in biological science at the third- or fourth-year level, with a minimum of six of these credit hours at the fourth-year level.

Additional science courses – total of 27 credit hours
These science courses must include:

- BIOL 4080U Bioethics;
- CHEM 2020U Introduction to Organic Chemistry;
- STAT 2020U Statistics and Probability for Biological Science; and
- Fourth-year science elective.

The remaining 15 credit hours must be in courses offered by the Faculty of Science in the subject areas of:

- Biology;
- Chemistry;
- Computing Science;
- Energy and Environment Science;
- Forensic Science;
- Mathematics;
- Physics; or
- SCIE 3920U.

Particular sets of science courses are designated as minor programs. Students should consult Section 14.13 of this calendar for further information.

Liberal studies and non-science courses – 12 credit hours
These courses must be in subjects not taught within the Faculty of Science.

General electives – 12 credit hours
These courses may be in science or in non-science subjects.

Notes:
The program must include 36 credit hours in science courses at the third- and fourth-year level; of these, at least 12 credit hours must be at the fourth-year level.

No more than 42 credit hours may be taken at the first-year level.

14.5.4.2 Biological Science – Environmental Toxicology

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
MATH 1020U Calculus II
PHY 1040U Physics for Biosciences++
Elective**(CSCI 1030U Introduction to Computer Science is recommended)

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

++Students who wish to take upper-year physics courses must take PHY 1010U or PHY 1030U and PHY 1020U. However, students who achieve a B standing or higher in PHY 1040U will be permitted to proceed to higher-level physics courses.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
BIOL 2010U Introductory Physiology
BIOL 2030U Cell Biology
CHEM 2020U Introduction to Organic Chemistry
CHEM 2130U Analytical Chemistry for Biosciences
STAT 2020U Statistics and Probability for Biological Science

Semester 2 (15 credit hours)
BIOL 2020U Genetics and Molecular Biology
BIOL 2080U Biochemistry I
BIOL 2060U Introduction to Microbiology and Immunology
ENVS 1000U Environmental Science
Elective**

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 2010U Introductory Physiology
BIOL 2030U Cell Biology
CHEM 2020U Introduction to Organic Chemistry
CHEM 2130U Analytical Chemistry for Biosciences
STAT 2020U Statistics and Probability for Biological Science

Semester 2 (15 credit hours)
BIOL 2020U Genetics and Molecular Biology
BIOL 2080U Biochemistry I
BIOL 2060U Introduction to Microbiology and Immunology
ENVS 1000U Environmental Science
Elective**

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Regular program

Semester 1 (15 credit hours)
BIOL 3020U Principles of Pharmacology and Toxicology
BIOL 3050U Developmental Biology
BIOL 3080U Biochemistry II
Two electives **

Semester 2 (15 credit hours)
CHEM 3830U Instrumental Analytical Chemistry
STAT 3010U Biostatistics
Three electives **

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 3020U Principles of Pharmacology and Toxicology
BIOL 3050U Developmental Biology
BIOL 3080U Biochemistry II
Two electives **

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Regular program

Semester 1 (15 credit hours)
BIOL 4010U Introduction to Environmental Research Methods
BIOL 4020U Environmental Risk Characterization
CHEM 4050U Environmental Chemistry
BIOL 4410U Biology Thesis Project I*** or Senior Biology elective**
Elective**

Semester 2 (15 credit hours)
BIOL 4030U Advanced Topics in Environmental Toxicology
BIOL 4080U Bioethics
BIOL 4420U Biology Thesis Project II*** or Senior Biology elective**
Senior Biology elective**
Elective**

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
CHEM 3830U Instrumental Analytical Chemistry
STAT 3010U Biostatistics
Three electives **

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 4010U Introduction to Environmental Research Methods
BIOL 4020U Environmental Risk Characterization
CHEM 4050U Environmental Chemistry
BIOL 4410U Biology Thesis Project I*** or Senior Biology elective**
Elective**

Semester 2 (15 credit hours)
BIOL 4030U Advanced Topics in Environmental Toxicology
BIOL 4080U Bioethics
BIOL 4410U Biology Thesis Project I*** or Senior Biology elective**
Senior Biology elective**
Elective**

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete 30 elective credit hours including at least one senior biology elective. Students not accepted to take BIOL 4410U and BIOL 4420U must take an additional two senior biology electives for a total of 36 elective credit hours. A senior biology elective is defined as any 4000-level biology course not specified in the course map. At least 15 elective credit hours must be in science courses offered by the Faculty of Science including at least one senior biology elective. The additional two senior science electives, if taken in place of BIOL 4410U and BIOL 4420U, cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in biology (BIOL) courses; at least 12 elective credit hours must be in courses outside the Faculty of Science.

*****Thesis project or senior biology elective courses**
Students in clear academic standing who have completed 90 credit hours of their BIOL program and six third-year required courses may optionally apply to take a two-course sequence consisting of BIOL 4410U and BIOL 4420U (Thesis Project in Biology I and II). Students not accepted to take the thesis courses must complete two additional senior biology electives instead. A senior biology elective is defined as any 4000-level biology course not specified in the course map. A student meeting the above requirements who does not take BIOL 4410U and BIOL 4420U may optionally apply to take BIOL 4430U (Directed Studies in Biology) as one of the required senior biology electives. Opportunities for the Thesis Project and Directed Studies options are limited; for either of these options, students must apply through Science Advising by April 30 following completion of the first three years of the program.

14.5.4.3 Biological Science – Life Sciences

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
MATH 1020U Calculus II
PHY 1040U Physics for Biosciences++
PSYC 1000U Introductory Psychology

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

++Students who wish to take upper-year physics courses must take PHY 1010U or PHY 1030U and PHY 1020U. However, students who achieve a B standing or higher in PHY 1040U will be permitted to proceed to higher level physics courses.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
BIOL 2010U Introductory Physiology
BIOL 2030U Cell Biology
CHEM 2020U Introduction to Organic Chemistry
STAT 2020U Statistics and Probability for Biological Science
Elective**

Semester 2 (15 credit hours)
BIOL 2020U Genetics and Molecular Biology
BIOL 2080U Biochemistry I
BIOL 2050U Human Anatomy
BIOL 2060U Introduction to Microbiology and Immunology
CHEM 2120U Organic Chemistry

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 2010U Introductory Physiology
BIOL 2030U Cell Biology
CHEM 2020U Introduction to Organic Chemistry
STAT 2020U Statistics and Probability for Biological Science
Elective**

Semester 2 (15 credit hours)
BIOL 2020U Genetics and Molecular Biology
BIOL 2080U Biochemistry I
BIOL 2050U Human Anatomy
BIOL 2060U Introduction to Microbiology and Immunology
CHEM 2120U Organic Chemistry

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Regular program

Semester 1 (15 credit hours)
BIOL 3020U Principles of Pharmacology and Toxicology
BIOL 3080U Biochemistry II
Three electives **

Semester 2 (15 credit hours)
BIOL 3040U Physiology of Regulatory Systems
BIOL 3060U Fundamentals of Neuroscience
BIOL 3650U Fundamentals of Nutrition
Two electives **

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 3020U Principles of Pharmacology and Toxicology
BIOL 3080U Biochemistry II
Three electives **

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Regular program

Semester 1 (15 credit hours)
BIOL 4070U Advanced Biochemistry
BIOL 4410U Biology Thesis Project I*** or
Senior Biology elective**
Three electives **

Semester 2 (15 credit hours)
BIOL 4050U Advanced Topics in Pharmaceutical
Biotechnology
BIOL 4080U Bioethics
BIOL 4420U Biology Thesis Project II*** or
Senior Biology elective**
Two electives **

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
BIOL 3040U Physiology of Regulatory Systems
BIOL 3060U Fundamentals of Neuroscience
BIOL 3650U Fundamentals of Nutrition
Two electives **

Semester 3
SCCO 5000W Co-op Work Term V*
*This course is graded on a pass/fail basis.

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 4070U Advanced Biochemistry
BIOL 4410U Biology Thesis Project I*** or
Senior Biology elective**
Three electives **

Semester 2 (15 credit hours)
BIOL 4050U Advanced Topics in Pharmaceutical
Biotechnology
BIOL 4080U Bioethics
BIOL 4420U Biology Thesis Project II*** or
Senior Biology elective**
Two electives **

Notes:
No more than 42 credit hours maybe taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete 33 elective credit hours. Students not accepted to take BIOL 4410U and BIOL 4420U must take an additional two senior biology electives for a total of 39 elective credit hours. A senior biology elective is defined as any 4000-level biology course not specified in the course map. At least 15 elective credit hours must be in science courses offered by the Faculty of Science. The additional two senior biology electives, if taken in place of BIOL 4410U and BIOL 4420U, cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in biology (BIOL) courses; at least 12 elective credit hours must be in courses outside the Faculty of Science.

*****Thesis project or senior biology elective courses**
Students in clear academic standing who have completed 90 credit hours of their BIOL program and six third-year required courses may optionally apply to take a two-course sequence consisting of BIOL 4410U and BIOL 4420U (Thesis Project in Biology I and II). Students not accepted to take the thesis courses must complete two additional senior biology electives instead. A senior biology elective is defined as any 4000-level biology course not specified in the course map. A student meeting the above requirements who does not take BIOL 4410U and BIOL 4420U may optionally apply to take BIOL 4430U (Directed Studies in Biology) as one of the required senior biology electives. Opportunities for the Thesis Project and Directed Studies options are limited; for either of these options, students must apply through Science Advising by April 30 following completion of the first three years of the program.

14.5.4.4 Biological Science – Pharmaceutical Biotechnology

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
MATH 1020U Calculus II
PHY 1040U Physics for Biosciences++
Elective**(CSCI 1030U Introduction to Computer Science is recommended)

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

++Students who wish to take upper-year physics courses must take PHY 1010U or PHY 1030U and PHY 1020U. However, students who achieve a B standing or higher in PHY 1040U will be permitted to proceed to higher-level physics courses.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
BIOL 2010U Introductory Physiology
BIOL 2030U Cell Biology
CHEM 2020U Introduction to Organic Chemistry
CHEM 2130U Analytical Chemistry for Biosciences
STAT 2020U Statistics and Probability for Biological Science

Semester 2 (15 credit hours)
BIOL 2020U Genetics and Molecular Biology
BIOL 2080U Biochemistry I
BIOL 2060U Introduction to Microbiology and Immunology
Two electives **

YEAR 3 – Regular program

Semester 1 (15 credit hours)
BIOL 3020U Principles of Pharmacology and Toxicology
BIOL 3032U Advanced Microbiology
BIOL 3050U Developmental Biology
BIOL 3080U Biochemistry II
Elective**

Semester 2 (15 credit hours)
BIOL 3010U Laboratory Methods in Molecular Biology
BIOL 3040U Physiology of Regulatory Systems
CHEM 3830U Instrumental Analytical Chemistry
Two electives **

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 2010U Introductory Physiology
BIOL 2030U Cell Biology
CHEM 2020U Introduction to Organic Chemistry
CHEM 2130U Analytical Chemistry for Biosciences
STAT 2020U Statistics and Probability for Biological Science

Semester 2 (15 credit hours)
BIOL 2020U Genetics and Molecular Biology
BIOL 2080U Biochemistry I
BIOL 2060U Introduction to Microbiology and Immunology
Two electives **

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 3020U Principles of Pharmacology and Toxicology
BIOL 3032U Advanced Microbiology
BIOL 3050U Developmental Biology
BIOL 3080U Biochemistry II
Elective**

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Regular program

Semester 1 (15 credit hours)
BIOL 4040U Applied Molecular Biology
BIOL 4070U Advanced Biochemistry
BIOL 4410U Biology Thesis Project I*** or Senior Biology elective**
Two electives **

Semester 2 (15 credit hours)
BIOL 4050U Advanced Topics in Pharmaceutical Biotechnology
BIOL 4060U Functional Genomics and Proteomics
BIOL 4080U Bioethics
BIOL 4420U Biology Thesis Project II*** or Senior Biology elective**
Elective**

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
BIOL 3010U Laboratory Methods in Molecular Biology
BIOL 3040U Physiology of Regulatory Systems
CHEM 3830U Instrumental Analytical Chemistry
Two electives **

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 4040U Applied Molecular Biology
BIOL 4070U Advanced Biochemistry
BIOL 4410U Biology Thesis Project I*** or Senior Biology elective**
Two electives **

Semester 2 (15 credit hours)
BIOL 4050U Advanced Topics in Pharmaceutical Biotechnology
BIOL 4060U Functional Genomics and Proteomics
BIOL 4080U Bioethics
BIOL 4420U Biology Thesis Project II*** or Senior Biology elective**
Elective**

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete 27 elective credit hours. Students not accepted to take BIOL 4410U and BIOL 4420U must take an additional two senior biology electives for a total of 33 elective credit hours. A senior biology elective is defined as any 4000-level biology course not specified in the course map. At least 12 elective credit hours must be in science courses offered by the Faculty of Science. The additional two senior biology electives, if taken in place of BIOL 4410U and BIOL 4420U, cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in biology (BIOL) courses; at least 12 elective credit hours must be in courses outside the Faculty of Science.

*****Thesis project or senior biology elective courses**
Students in clear academic standing who have completed 90 credit hours of their BIOL program and six third-year required courses may optionally apply to take a two-course sequence consisting of BIOL 4410U and BIOL 4420U (Thesis Project in Biology I and II). Students not accepted to take the thesis courses must complete two additional senior biology electives instead. A senior biology elective is defined as any 4000-level biology course not specified in the course map. A student meeting the above requirements who does not take BIOL 4410U and BIOL 4420U may optionally apply to take BIOL 4430U (Directed Studies in Biology) as one of the required senior biology electives. Opportunities for the Thesis Project and Directed Studies options are limited; for either of these options, students must apply through Science Advising by April 30 following completion of the first three years of the program.

14.6 Program information – Bachelor of Science (Honours) in Chemistry – Regular program and Co-operative Education program

14.6.1 General information

Chemistry is known as the central science. At UOIT, students will learn practical and theoretical skills related to this science. The Chemistry program covers the main divisions of chemistry, including physical chemistry, analytical chemistry, organic chemistry, inorganic chemistry and biochemistry.

Students will have the privilege of being able to use state-of-the-art laboratories and teaching environments in newly constructed facilities.

The Chemistry program offers specializations in Biological Chemistry and Pharmaceutical Chemistry, as well as a general Chemistry degree (Comprehensive).

14.6.2 Admission requirements

See Section 14.2.

14.6.3 Careers

There are many opportunities for graduates in chemistry, whether pursuing higher education or entering the workforce. The following list of career fields is simply a starting point to the variety of career opportunities available for consideration: education and training, industry, medicine and health, and government agencies.

14.6.4 Program details and degree requirements – Bachelor of Science (Honours) in Chemistry

In addition to the regular program, an optional co-operative education program is available to students in Chemistry including Chemistry Comprehensive, Biological Chemistry, and Pharmaceutical Chemistry (see Section 14.3 for co-op program details).

The requirements for the regular and co-operative education programs are detailed in the following program maps. Although reasonable efforts will be made to adhere to the following program maps, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.science.uoit.ca**.

14.6.4.1 Chemistry – Comprehensive

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1000U Introductory Calculus+ or
  MATH 1010U Calculus I+
PHY 1010U Physics I+ or
  PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
MATH 1020U Calculus II
PHY 1020U Physics II
Elective** (MATH 2050U Linear Algebra is recommended)

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
CHEM 2010U Structure and Bonding
CHEM 2020U Introduction to Organic Chemistry
CHEM 2030U Analytical Chemistry
STAT 2010U Statistics and Probability for Physical Science
Elective**

Semester 2 (15 credit hours)
BIOL 2080U Biochemistry I
CHEM 2040U Thermodynamics and Kinetics
CHEM 2120U Organic Chemistry
Two electives **

YEAR 3 – Regular program

Semester 1 (15 credit hours)
CHEM 3040U Fundamentals of Physical Chemistry
CHEM 3220U Structure Determination of Organic Molecules
CHEM 3510U Inorganic Chemistry I
CHEM 3530U Instrumental Analytical Chemistry I
Elective**

Semester 2 (15 credit hours)
CHEM 3120U Advanced Organic Chemistry
CHEM 3520U Inorganic Chemistry II
CHEM 3540U Instrumental Analytical Chemistry II
Two electives**

YEAR 4 – Regular program

Semester 1 (15 credit hours)
CHEM 4040U Physical Chemistry
CHEM 4410U Chemistry Thesis Project I*** or Senior Chemistry elective **
Senior Chemistry elective **
Two electives **

Semester 2 (15 credit hours)
CHEM 4060U Chemical and Molecular Spectroscopy
CHEM 4420U Chemistry Thesis Project II*** or Senior Chemistry elective **
Senior Chemistry elective **
Two electives **

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
CHEM 2010U Structure and Bonding
CHEM 2020U Introduction to Organic Chemistry
CHEM 2030U Analytical Chemistry
STAT 2010U Statistics and Probability for Physical Science
Elective**

Semester 2 (15 credit hours)
BIOL 2080U Biochemistry I
CHEM 2040U Thermodynamics and Kinetics
CHEM 2120U Organic Chemistry
Two electives **

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
CHEM 3040U Fundamentals of Physical Chemistry
CHEM 3220U Structure Determination of Organic Molecules
CHEM 3510U Inorganic Chemistry I
CHEM 3530U Instrumental Analytical Chemistry I
Elective**

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
CHEM 3120U Advanced Organic Chemistry
CHEM 3520U Inorganic Chemistry II
CHEM 3540U Instrumental Analytical Chemistry II
Two electives**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
CHEM 4040U Physical Chemistry
CHEM 4410U Chemistry Thesis Project I*** or Senior Chemistry elective **
Senior Chemistry elective**
Two electives**

Semester 2 (15 credit hours)
CHEM 4060U Chemical and Molecular Spectroscopy
CHEM 4420U Chemistry Thesis Project II*** or Senior Chemistry elective **
Senior Chemistry elective **
Two electives**

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete a total of 39 elective credit hours including six credit hours in senior chemistry electives. Students who are not accepted into the thesis option (CHEM 4410U/4420U) must take two additional senior chemistry electives for a total of 45 elective credit hours. A senior chemistry elective is defined as any 4000-level chemistry course not specified in the course map. At least 21 credit hours must be in courses offered by the Faculty of Science including the senior chemistry electives; the additional senior chemistry electives required for students who are not enrolled in thesis cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in chemistry (CHEM) courses; at least 12 credit hours must be in courses outside the Faculty of Science.

*****Thesis project or senior chemistry elective courses**
Students in clear academic standing who have completed 90 credit hours of their CHEM program and six third-year required courses may optionally apply to take a two-course sequence consisting of CHEM 4410U and CHEM 4420U (Thesis Project in Chemistry I and II). Students not accepted to take the thesis courses must complete two additional senior chemistry electives instead. A senior chemistry elective is defined as any 4000-level chemistry course not specified in the course map. A student meeting the above requirements who does not take CHEM 4410U and CHEM 4420U may optionally apply to take CHEM 4430U (Directed Studies in Chemistry) as one of the required senior chemistry electives. Opportunities for the Thesis Project and Directed Studies options are limited; for either of these options, students must apply through Science Advising by April 30 following completion of the first three years of the program.

14.6.4.2 Chemistry – Biological Chemistry specialization

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
MATH 1020U Calculus II
PHY 1020U Physics II
Elective**(MATH 2050U Linear Algebra is recommended)

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
BIOL 2030U Cell Biology
CHEM 2010U Structure and Bonding
CHEM 2020U Introduction to Organic Chemistry
CHEM 2030U Analytical Chemistry
STAT 2010U Statistics and Probability for Physical Science

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 2030U Cell Biology
CHEM 2010U Structure and Bonding
CHEM 2020U Introduction to Organic Chemistry
CHEM 2030U Analytical Chemistry
STAT 2010U Statistics and Probability for Physical Science

YEAR 2 – Regular program

Semester 2 (15 credit hours)
BIOL 2020U Genetic and Molecular Biology
BIOL 2080U Biochemistry I
BIOL 2060U Introduction to Microbiology and Immunology
CHEM 2040U Thermodynamics and Kinetics
CHEM 2120U Organic Chemistry

YEAR 3 – Regular program

Semester 1 (15 credit hours)
BIOL 3032U Advanced Microbiology
BIOL 3080U Biochemistry II
CHEM 3040U Fundamentals of Physical Chemistry
CHEM 3220U Structure Determination of Organic Molecules
CHEM 3530U Instrumental Analytical Chemistry I

Semester 2 (15 credit hours)
BIOL 3010U Laboratory Methods in Molecular Biology
CHEM 3120U Advanced Organic Chemistry
CHEM 3540U Instrumental Analytical Chemistry II
Two electives**

YEAR 4 – Regular program

Semester 1 (15 credit hours)
BIOL 4070U Advanced Biochemistry
CHEM 3510U Inorganic Chemistry I
CHEM 4110U Bio-Organic Chemistry
CHEM 4410U Chemistry Thesis Project I*** or Senior Chemistry elective**
Senior Chemistry elective**

Semester 2 (15 credit hours)
CHEM 3520U Inorganic Chemistry II
CHEM 4120U Advanced Topics in Biological Chemistry
CHEM 4420U Chemistry Thesis Project II***or Senior Chemistry elective**
Senior Chemistry elective**
Elective**

YEAR 2 – Co-operative Education program

Semester 2 (15 credit hours)
BIOL 2020U Genetic and Molecular Biology
BIOL 2080U Biochemistry I
BIOL 2060U Introduction to Microbiology and Immunology
CHEM 2040U Thermodynamics and Kinetics
CHEM 2120U Organic Chemistry

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 3032U Advanced Microbiology
BIOL 3080U Biochemistry II
CHEM 3040U Fundamentals of Physical Chemistry
CHEM 3220U Structure Determination of Organic Molecules
CHEM 3530U Instrumental Analytical Chemistry I

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
BIOL 3010U Laboratory Methods in Molecular Biology
CHEM 3120U Advanced Organic Chemistry
CHEM 3540U Instrumental Analytical Chemistry II
Two electives**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 4070U Advanced Biochemistry
CHEM 3510U Inorganic Chemistry I
CHEM 4110U Bio-Organic Chemistry ****
CHEM 4410U Chemistry Thesis Project I*** or Senior Chemistry elective**
Elective**

Semester 2 (15 credit hours)
CHEM 3520U Inorganic Chemistry II
CHEM 4120U Advanced Topics in Biological Chemistry ****
CHEM 4420U Chemistry Thesis Project II***or Senior Chemistry elective**
Two electives **

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete a total of 18 elective credit hours including six credit hours in senior chemistry electives. Students who are not accepted into the thesis option (CHEM 4410U/4420U) must take two additional senior chemistry electives for a total of 24 elective credit hours. A senior chemistry elective is defined as any 4000-level chemistry course not specified in the course map. At least 6 credit hours must be in courses offered by the Faculty of Science including the senior chemistry electives; the additional senior chemistry electives required for students who are not enrolled in thesis cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in chemistry (CHEM) courses; at least 12 credit hours must be in courses outside the Faculty of Science.

*****Thesis project or senior chemistry elective courses**
Students in clear academic standing who have completed 90 credit hours of their CHEM program and six third-year required courses may optionally apply to take a two-course sequence consisting of CHEM 4410U and CHEM 4420U (Thesis Project in Chemistry I and II). Students not accepted to take the thesis courses must complete two additional senior chemistry electives instead. A senior chemistry elective is defined as any 4000-level chemistry course not specified in the course map. A student meeting the above requirements who does not take CHEM 4410U and CHEM 4420U may optionally apply to take CHEM 4430U (Directed Studies in Chemistry) as one of the required senior chemistry electives. Opportunities for the Thesis Project and Directed Studies options are limited; for either of these options, students must apply through Science Advising by April 30 following completion of the first three years of the program.

14.6.4.3 Chemistry – Pharmaceutical Chemistry specialization

YEAR 1 Regular Program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
MATH 1020U Calculus II
PHY 1020U Physics II
Elective** (MATH 2050U Linear Algebra is recommended)

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
BIOL 2010U Introductory Physiology
CHEM 2010U Structure and Bonding
CHEM 2020U Introduction to Organic Chemistry
CHEM 2030U Analytical Chemistry
STAT 2010U Statistics and Probability for Physical Science

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 2010U Introductory Physiology
CHEM 2010U Structure and Bonding
CHEM 2020U Introduction to Organic Chemistry
CHEM 2030U Analytical Chemistry
STAT 2010U Statistics and Probability for Physical Science

YEAR 2 – Regular program

Semester 2 (15 credit hours)
BIOL 2080U Biochemistry I
CHEM 2040U Thermodynamics and Kinetics
CHEM 2120U Organic Chemistry
Two electives**

YEAR 3 – Regular program

Semester 1 (15 credit hours)
BIOL 3020U Principles of Pharmacology and Toxicology
BIOL 3080U Biochemistry II
CHEM 3040U Fundamentals of Physical Chemistry
CHEM 3220U Structure Determination of Organic Molecules
CHEM 3530U Instrumental Analytical Chemistry I

Semester 2 (15 credit hours)
BIOL 4050U Advanced Topics in Pharmaceutical Biotechnology
CHEM 3120U Advanced Organic Chemistry
CHEM 3540U Instrumental Analytical Chemistry II
Two electives**

YEAR 4 – Regular program

Semester 1 (15 credit hours)
BIOL 4070U Advanced Biochemistry
CHEM 3510U Inorganic Chemistry I
CHEM 4040U Physical Chemistry
CHEM 4410U Chemistry Thesis Project I*** or Senior Chemistry elective**
CHEM 4510U Pharmaceutical Discovery

Semester 2 (15 credit hours)
CHEM 3520U Inorganic Chemistry II
CHEM 4520U Advanced Topics in Pharmaceutical Chemistry
CHEM 4420U Chemistry Thesis Project II*** or Senior Chemistry elective**
Two Senior Chemistry electives **

YEAR 2 – Co-operative Education program

Semester 2 (15 credit hours)
BIOL 2080U Biochemistry I
CHEM 2040U Thermodynamics and Kinetics
CHEM 2120U Organic Chemistry
Two electives **

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 3020U Principles of Pharmacology and Toxicology
BIOL 3080U Biochemistry II
CHEM 3040U Fundamentals of Physical Chemistry
CHEM 3220U Structure Determination of Organic Molecules
CHEM 3530U Instrumental Analytical Chemistry I

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
BIOL 4050U Advanced Topics in Pharmaceutical Biotechnology
CHEM 3120U Advanced Organic Chemistry
CHEM 3540U Instrumental Analytical Chemistry II
Two electives**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 4070U Advanced Biochemistry
CHEM 3510U Inorganic Chemistry I
CHEM 4040U Physical Chemistry
CHEM 4410U Chemistry Thesis Project I*** or Senior Chemistry elective**
CHEM 4510U Pharmaceutical Discovery

Semester 2 (15 credit hours)
CHEM 3520U Inorganic Chemistry II
CHEM 4520U Advanced Topics in Pharmaceutical Chemistry
CHEM 4420U Chemistry Thesis Project II*** or Senior Chemistry elective**
Two electives **

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete a total of 21 elective credit hours including six credit hours in senior chemistry electives. Students who are not accepted into the thesis option (CHEM 4410U/4420U) must take two additional senior chemistry electives for a total of 27 elective credit hours. A senior chemistry elective is defined as any 4000-level chemistry course not specified in the course map. At least 9 credit hours must be in courses offered by the Faculty of Science including the senior chemistry electives; the additional senior chemistry electives required for students who are not enrolled in thesis cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in chemistry (CHEM) courses; at least 12 credit hours must be in courses outside the Faculty of Science.

*****Thesis project or senior chemistry elective courses**
Students in clear academic standing who have completed 90 credit hours of their CHEM program and six third-year required courses may optionally apply to take a two-course sequence consisting of CHEM 4410U and CHEM 4420U (Thesis Project in Chemistry I and II). Students not accepted to take the thesis courses must complete two additional senior chemistry electives instead. A senior chemistry elective is defined as any 4000-level chemistry course not specified in the course map. A student meeting the above requirements who does not take CHEM 4410U and CHEM 4420U may optionally apply to take CHEM 4430U (Directed Studies in Chemistry) as one of the required senior chemistry electives. Opportunities for the Thesis Project and Directed Studies options are limited; for either of these options, students must apply through Science Advising by April 30 following completion of the first three years of the program.

14.7 Program information – Bachelor of Science (Honours) in Computing Science – Regular program and Co-operative Education program

14.7.1 General information

Graduates of this program will obtain a solid foundation in the theory and application of the principles of computing science, as well as in the cognitive capabilities and skills relating to computing science. This program also provides the opportunity for the student to develop practical capabilities and skills, such as software design and implementation, information management, risk assessment, effective deployment of software tools and system evaluation. In addition, transferable skills such as communication, teamwork, self-management and professional development are emphasized in many courses.

The Computing Science program at UOIT was developed in collaboration with leading representatives from both academia and industry and is designed to meet the increasing need for graduates with the knowledge and skills in this important field.

Specializations within this degree program include Digital Forensics, and Digital Media, as well as the general Computing Science degree (Comprehensive).

14.7.2 Admission requirements

See Section 14.2.

14.7.3 Careers

There are many opportunities for graduates in computing science, whether pursuing higher education or entering the workforce. The following list of career fields is simply a starting point to the variety of career opportunities available for consideration: computer consultant, scientist, engineer, systems analyst, information specialist, technical support analyst, computer programmer, and software designer.

14.7.4 Program details and degree requirements – Bachelor of Science (Honours) in Computing Science

In addition to the regular program, an optional co-operative education program is available to students in Computing Science including Comprehensive, Digital Forensics, and Digital Media (see Section 14.3 for co-op program details).

The requirements for the regular and co-operative education programs are detailed in the following program maps. Although reasonable efforts will be made to adhere to the following program maps, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.science.uoit.ca**.

14.7.4.1 Computing Science – Comprehensive

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1030U Introduction to Computer Science with C++
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II or
CHEM 1020U Chemistry II
CSCI 2030U Programming Workshop
MATH 1020U Calculus II
MATH 2050U Linear Algebra
PHY 1020U Physics II

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
CSCI 2010U Principles of Computer Science
CSCI 2110U Discrete Structures in Computer Science
STAT 2010U Statistics and Probability for Physical Science
Elective**

Semester 2 (15 credit hours)
CSCI 2020U Software Systems Development and Integration
CSCI 2050U Computer Architecture I
CSCI 3040U Software Engineering I
MATH 2072U Computational Science I
Elective**

YEAR 3 – Regular program

Semester 1 (15 credit hours)
CSCI 3020U Operating Systems
CSCI 3030U Database Systems and Concepts
CSCI 3070U Analysis and Design of Algorithms
CSCI 3150U Computer Networks
Elective**

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or
CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 3060U Software Engineering II
CSCI 3090U Scientific Visualization and Computer Graphics
CSCI 4020U Compilers
Elective**

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
CSCI 2010U Principles of Computer Science
CSCI 2110U Discrete Structures in Computer Science
STAT 2010U Statistics and Probability for Physical Science
Elective**

Semester 2 (15 credit hours)
CSCI 2020U Software Systems Development and Integration
CSCI 2050U Computer Architecture I
CSCI 3040U Software Engineering I
MATH 2072U Computational Science I
Elective**

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 3020U Operating Systems
CSCI 3030U Database Systems and Concepts
CSCI 3070U Analysis and Design of Algorithms
CSCI 3150U Computer Networks
Elective**

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Regular program

Semester 1 (15 credit hours)
CSCI 3010U Simulation and Modeling
CSCI 4410U Computing Science Thesis Project I*** or senior Computing Science elective***
Computing Science elective**
Two electives**

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 4420U Computing Science Thesis Project II*** or senior Computing Science elective***
Two Computing Science electives**
Elective**

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 3060U Software Engineering II
CSCI 3090U Scientific Visualization and Computer Graphics
CSCI 4020U Compilers
Elective**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 3010U Simulation and Modeling
CSCI 4410U Computing Science Thesis Project I*** or senior Computing Science elective***
Computing Science elective**
Two electives**

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 4420U Computing Science Thesis Project II*** or senior Computing Science elective***
Two Computing Science electives**
Elective**

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

++CSCI 3055U (Programming Languages) and CSCI 4040U (Ethics, Law and the Social Impact of Computing) are offered in alternating years.

****Electives and breadth requirements**
Students must complete 30 elective credit hours including the three computing science electives. At least 12 credit hours must be in courses offered by the Faculty of Science including the three computing science electives; the additional senior computing science electives taken in lieu of CSCI 4410U and CSCI 4420U (by students not accepted into the thesis program) cannot be used to meet this requirement. In order to satisfy the breadth requirements, no more than 12 elective credit hours may be in computing science (CSCI) courses; at least 12 elective credit hours must be in courses outside the Faculty of Science.

Computing Science electives:
CSCI 2160U Digital Media
CSCI 3050U Computer Architecture II
CSCI 4100U Mobile Devices
CSCI 4610U Artificial Intelligence
CSCI 4620U Human-Computer Interaction
CSCI 4630U High-Performance Computing
CSCI 4640U Distributed Computing
CSCI 4650U Elements of Theory of Computation
MATH 4020U Computational Science II

*****Thesis project or senior computing science elective courses**
Students in clear academic standing who have completed 90 credit hours of their program and six third-year required courses may optionally apply to take a two-course sequence consisting of CSCI 4410U and CSCI 4420U (Computing Science Thesis Project I and II). Students not accepted to take the thesis courses must complete two additional senior computing science electives instead. A student meeting the above requirements who does not take CSCI 4410U and CSCI 4420U may optionally apply to take CSCI 4430U (Directed Studies in Computing Science) as one of the required computer science electives. Opportunities for the Thesis Project and Directed Studies courses are limited; students must apply through Science Advising by April 30 following completion of the first three years of the program.

14.7.4.2 Computing Science – Digital Forensics specialization

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1030U Introduction to Computer Science with C++
MATH 1000U Introductory Calculus++ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
FSCI 1010U Introduction to Forensic Science
CSCI 2030U Programming Workshop
MATH 1020U Calculus II
MATH 2050U Linear Algebra
PHY 1020U Physics II

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2– Regular program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
CSCI 2010U Principles of Computer Science
CSCI 2110U Discrete Structures in Computer Science
STAT 2010U Statistics and Probability for Physical Science
FSCI 2010U Crime Scene Science

Semester 2 (15 credit hours)
BIOL 1020U Biology II or
CHEM 1020U Chemistry II
CSCI 2020U Software Systems Development and Integration
CSCI 2050U Computer Architecture I
MATH 2072U Computational Science I
Elective**

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
CSCI 2010U Principles of Computer Science
CSCI 2110U Discrete Structures in Computer Science
STAT 2010U Statistics and Probability for Physical Science
FSCI 2010U Crime Scene Science

Semester 2 (15 credit hours)
BIOL 1020U Biology II or
CHEM 1020U Chemistry II
CSCI 2020U Software Systems Development and Integration
CSCI 2050U Computer Architecture I
MATH 2072U Computational Science I
Elective**

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Regular program

Semester 1 (15 credit hours)
CSCI 3020U Operating Systems
CSCI 3030U Database Systems and Concepts
CSCI 3070U Analysis and Design of Algorithms
CSCI 3150U Computer Networks
FSCI 3010U Criminalistics I

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or
CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 3090U Scientific Visualization and Computer Graphics
CSCI 4020U Compilers
Two electives**

YEAR 4 – Regular program

Semester 1 (15 credit hours)
CSCI 3010U Simulation and Modeling
CSCI 4120U Digital Evidence
CSCI 4130U Digital Informatics
CSCI 4410U Computing Science Thesis Project I*** or senior Computing Science elective***
Computing Science elective**

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or
CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 4420U Computing Science Thesis Project II*** or senior Computing Science elective***
FSCI 4050U Law for Forensic Science
Computing Science elective**
Elective**

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 3020U Operating Systems
CSCI 3030U Database Systems and Concepts
CSCI 3070U Analysis and Design of Algorithms
CSCI 3150U Computer Networks
FSCI 3010U Criminalistics I

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or
CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 3090U Scientific Visualization and Computer Graphics
CSCI 4020U Compilers
Two electives**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 3010U Simulation and Modeling
CSCI 4120U Digital Evidence
CSCI 4130U Digital Informatics
CSCI 4410U Computing Science Thesis Project I*** or senior Computing Science elective***
Computing Science elective**

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or
CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 4420U Computing Science Thesis Project II*** or senior Computing Science elective***
FSCI 4050U Law for Forensic Science
Two electives**

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
Students must complete 18 elective credit hours including the two computing science electives. At least 6 credit hours must be in courses offered by the Faculty of Science, including the two computing science electives; the additional senior computing science electives taken in lieu of CSCI 4410U and CSCI 4420U (by

students not accepted into the thesis program) cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 3 additional elective credit hours may be in computing science (CSCI) courses; at least 12 elective credit hours must be in courses outside the Faculty of Science.

Recommended electives:
INFR 2470U CISCO Security I: Fundamentals of Network Security
INFR 2480U CISCO Security II: Network Security
INFR 2570U Cybercrime

Computing Science electives:
CSCI 2160U Digital Media
CSCI 3050U Computer Architecture II
CSCI 4100U Mobile Devices
CSCI 4610U Artificial Intelligence
CSCI 4620U Human-Computer Interaction
CSCI 4630U High-Performance Computing
CSCI 4640U Distributed Computing
CSCI 4650U Elements of Theory of Computation
MATH 4020U Computational Science II

*****Thesis project or senior computing science elective courses**
Students in clear academic standing who have completed 90 credit hours of their program and six third-year required courses may optionally apply to take a two course sequence consisting of CSCI 4410U and CSCI 4420U (Computing Science Thesis Project I and II). Students not accepted to take the thesis courses must complete two additional computing science electives instead. A student meeting the above requirements who does not take CSCI 4410U and CSCI 4420U may optionally apply to take CSCI 4430U (Directed Studies in Computing Science) as one of the required computer science electives. Opportunities for the Thesis Project and Directed Studies courses are limited; students must apply through Science Advising by April 30 following completion of the first three years of the program.

Note: For the Digital Forensics specialization CSCI 4410U and CSCI 4420U – Thesis Projects I and II must deal with a topic in digital forensics.

14.7.4.3 Computing Science – Digital Media specialization

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1030U Introduction to Computer Science with C++
MATH 1000U Introductory Calculus+ or
  MATH 1010U Calculus I+
PHY 1010U Physics I+ or
  PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II or
  CHEM 1020U Chemistry II
CSCI 2030U Programming Workshop
MATH 1020U Calculus II
MATH 2050U Linear Algebra
PHY 1020U Physics II

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
CSCI 2010U Principles of Computer Science
CSCI 2110U Discrete Structures in Computer Science
STAT 2010U Statistics and Probability for Physical Science
Elective**

Semester 2 (15 credit hours)
CSCI 2020U Software Systems Development and Integration
CSCI 2050U Computer Architecture I
CSCI 2160U Digital Media
CSCI 3040U Software Engineering I
MATH 2072U Computational Science I

YEAR 3 – Regular program

Semester 1 (15 credit hours)
CSCI 3020U Operating Systems
CSCI 3030U Database Systems and Concepts
CSCI 3070U Analysis and Design of Algorithms
CSCI 3150U Computer Networks
Elective**

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 3060U Software Engineering II
CSCI 3090U Scientific Visualization and Computer Graphics
CSCI 4020U Compilers
Elective**

YEAR 4 – Regular program

Semester 1 (15 credit hours)
CSCI 3010U Simulation and Modeling
CSCI 4100U Mobile Devices
CSCI 4110U Advanced Computer Graphics
CSCI 4410U Computing Science Thesis Project I*** or Senior Computing Science elective**
Computing Science elective**

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 4160U Interactive Media
CSCI 4420U Computing Science Thesis Project II*** or Senior Computing Science elective**
Computing Science elective**
Elective**

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
CSCI 2010U Principles of Computer Science
CSCI 2110U Discrete Structures in Computer Science
STAT 2010U Statistics and Probability for Physical Science
Elective**

Semester 2 (15 credit hours)
CSCI 2020U Software Systems Development and Integration
CSCI 2050U Computer Architecture I
CSCI 2160U Digital Media
CSCI 3040U Software Engineering I
MATH 2072U Computational Science I

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 3020U Operating Systems
CSCI 3030U Database Systems and Concepts
CSCI 3070U Analysis and Design of Algorithms
CSCI 3150U Computer Networks
Elective**

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 3060U Software Engineering II
CSCI 3090U Scientific Visualization and Computer Graphics
CSCI 4020U Compilers
Elective**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 3010U Simulation and Modeling
CSCI 4100U Mobile Devices
CSCI 4110U Advanced Computer Graphics
CSCI 4410U Computing Science Thesis Project I*** or Senior Computing Science elective**
Computing Science elective**

Semester 2 (15 credit hours)
CSCI 3055U Programming Languages++ or CSCI 4040U Ethics, Law and the Social Impact of Computing++
CSCI 4160U Interactive Media
CSCI 4420U Computing Science Thesis Project II*** or Senior Computing Science elective**
Computing Science elective**
Elective**

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
Students must complete 18 elective credit hours including the two computing science electives. At least 6 credit hours must be in courses offered by the Faculty of Science, including the two computing science electives; the additional senior computing science electives taken in lieu of CSCI 4410U and CSCI 4420U (by students not accepted into the thesis program), cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 3 additional elective credit hours may be in computing science (CSCI) courses; at least 12 elective credit hours must be in courses outside the Faculty of Science.

Computing Science electives:
CSCI 3050U Computer Architecture II
CSCI 4610U Artificial Intelligence
CSCI 4620U Human-Computer Interaction
CSCI 4630U High-Performance Computing
CSCI 4640U Distributed Computing
CSCI 4650U Elements of Theory of Computation
MATH 4020U Computational Science II

*****Thesis project or senior computing science elective courses**
Students in clear academic standing who have completed 90 credit hours of their program and six third-year required courses may optionally apply to take a two course sequence consisting of CSCI 4410U and CSCI 4420U (Computing Science Thesis Project I and II). Students not accepted to take the thesis courses must complete two additional computing science electives instead. A student meeting the above requirements who does not take CSCI 4410U and CSCI 4420U may optionally apply to take CSCI 4430U (Directed Studies in Computing Science) as one of the required computer science electives. Opportunities for the Thesis Project and Directed Studies courses are limited; students must apply through Science Advising by April 30 following completion of the first three years of the program.

14.8 Program information – Bachelor of Science (Honours) in Forensic Science

14.8.1 General information

Forensic Science is an emerging interdisciplinary area of science that includes elements of social science and involves the use of scientific principles to analyze evidence for legal investigations. The BSc (Hons) in Forensic Science is distinguished by a strong scientific base in biology and chemistry, with allied courses related to forensic aspects of psychology, anthropology and law.

The Forensic Science program incorporates a foundation in chemistry, biology, physics and calculus. Through elective courses, students may acquire a deeper knowledge of either chemistry or biology, providing them with additional opportunities, including post-degree and graduate studies. In keeping with UOIT's mission to prepare students for careers, science programs also include development in leadership skills.

14.8.2 Admission requirements

See Section 14.2.

14.8.3 Careers

The following career options are simply a starting point to the variety of career opportunities available in the field of Forensic Science. Forensic science graduates can find career success as forensic scientists and crime scene investigators within organizations such as police agencies, insurance companies, and private practice firms. Graduates may choose to continue on to higher education in such areas as medical school, law school, graduate school, and teacher's college.

14.8.4 Program details and degree requirements – Bachelor of Science (Honours) in Forensic Science

Although reasonable efforts will be made to adhere to the following program map, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.science.uoit.ca**.

YEAR 1

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1000U Introductory Calculus+ or
    MATH 1010U Calculus I+
PHY 1010U Physics I+ or
    PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
FSCI 1010U Introductory Forensic Science
MATH 1020U Calculus II
PHY 1040U Physics for Biosciences++

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

++Students who wish to take upper year physics courses must take PHY 1010U or PHY 1030U and PHY 1020U. However, students who achieve a B standing or higher in PHY 1040U will be permitted to proceed to higher-level physics courses.

YEAR 2

Semester 1 (15 credit hours)
BIOL 2010U Introductory Physiology
BIOL 2030U Cell Biology
CHEM 2020U Introduction to Organic Chemistry
FSCI 2010U Crime Scene Science
STAT 2020U Statistics and Probability for Biological Science

Semester 2 (15 credit hours)
BIOL 2020U Genetics and Molecular Biology
BIOL 2080U Biochemistry I
BIOL 2050U Human Anatomy
CHEM 2120U Organic Chemistry
PSYC 1000U Introductory Psychology

YEAR 3

Semester 1 (15 credit hours)
BIOL 3020U Principles of Pharmacology and Toxicology
CHEM 2030U Analytical Chemistry
CHEM 3140U Physical Chemistry for Biosciences
FSCI 3010U Criminalistics I
Elective*

Semester 2 (15 credit hours)
CHEM 3830U Instrumental Analytical Chemistry
FSCI 3020U Forensic Biology
FSCI 3030U Criminalistics II
FSCI 3040U Forensic Chemistry
Elective*

YEAR 4

Semester 1 (15 credit hours)
FSCI 4020U Interdisciplinary Topics in Forensic Science
FSCI 4030U Forensic Drug Chemistry and Toxicology
FSCI 4410U Forensic Science Thesis Project I** or
  Senior Biology elective** or
  Senior Chemistry elective**
Two electives*

Semester 2 (15 credit hours)
FSCI 4010U Forensic Psychology
FSCI 4050U Law for Forensic Scientists
FSCI 4420U Forensic Science Thesis Project II** or
  Senior Biology elective** or
  Senior Chemistry elective**
Two electives*

Notes:
No more than 42 credit hours may be taken at the first-year level.

***Electives and breadth requirements**
All students must complete 18 elective credit hours. Students not accepted to take FSCI 4410U and FSCI 4420U must take an additional two senior biology or chemistry electives for a total of 24 elective credit hours. At least 9 elective credit hours must be in science courses offered by the Faculty of Science. The additional two senior biology or chemistry electives, if taken in place of FSCI 4410U and FSCI 4420U, cannot be used to meet this requirement or to satisfy minor requirements. In order to satisfy breadth requirements 9 credit hours must be in courses outside the Faculty of Science.

****Thesis Project and Senior Biology or Chemistry Elective courses**
Students in clear academic standing who have completed 90 credit hours of their program and six third-year required FSCI courses may optionally apply to take a two-course sequence consisting of FSCI 4410U and FSCI 4420U (Thesis Project in Forensic Science I and II). Students not accepted to take the thesis courses must complete two additional senior biology or chemistry electives instead. A senior biology or chemistry elective is defined as any third- or fourth-year series biology or chemistry course (BIOL 3000U/4000U or CHEM 3000U/4000U) not explicitly specified in the program map. A student meeting the above requirements who does not take FSCI 4410U and FSCI 4420U may optionally apply to take FSCI 4430U (Directed Studies in Forensic Science) as one of the required senior biology or chemistry electives. FSCI 4430U may be offered in either semester, depending on demand. Opportunities for the Thesis project and Directed Studies options are limited; for either of these options, students must apply to the forensic science fourth-year thesis co-ordinator by March 30 in the third year of their program.

14.8.5 Program progression requirements

Progression through the Forensic Science program is restricted. By June of each year, students must be in clear academic standing and have successfully completed the full set of required courses, including electives, of the prior academic terms in order to progress into the program's next academic year. Clear academic standing requires a minimum cumulative grade point average of 2.00. Students who do not meet this requirement will not be permitted to continue in any FSCI courses regardless of course prerequisites and will have the option to select another program offered by the Faculty of Science. After a period of one full academic year, students who have achieved clear academic standing and have completed all missing courses may reapply to the Forensic Science program. Readmission to the program will be dependent upon program space and resource availability and the grades of the student.

14.9 Program information – Bachelor of Science (Honours) in Physical Science – Regular program and Co-operative Education program

14.9.1 General information

The BSc (Hons) in Physical Science provides a foundation in chemistry, physics, mathematics, and computing science. Students will work with an academic advisor to customize a Physical Science program to match their interests and career plans. Students in this program may also select a minor program.

Learning takes place in classroom lectures, tutorials, laboratories, computer simulations, and through independent and group research, as well as multidimensional projects.

14.9.2 Admission requirements

See Section 14.2.

14.9.3 Careers

There is a wealth of opportunities for graduates in the physical sciences in industry, government, and in the field of applied science. Combined with the university's Bachelor of Education students can help to fill the need for mathematics, science and computer science teachers in Ontario's secondary schools.

14.9.4 Program details and degree requirements – Bachelor of Science (Honours) in Physical Science

A graduate from the Physical Science program must successfully complete 120 credit hours according to the following requirements.

First-year required science core – 21 credit hours
- BIOL 1010U Biology I;
- CHEM 1010U Chemistry I;
- MATH 1000U Introductory Calculus+ or MATH 1010U Calculus I+;
- MATH 1020U Calculus II;
- PHY 1010U Physics I+ or PHY 1030U Introductory Physics+;
- BIOL 1020U Biology II or CHEM 1020U Chemistry II; and
- PHY 1020U Physics II.

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

Additional core courses – 57 credit hours
These must include:

- STAT 2010U Statistics and Probability for Physical Science.

The remaining 54 credit hours must be in physical science in the areas of chemistry, computing science, mathematics, and physics.

Additional science courses – 18 credit hours
The remaining science courses must be offered by the Faculty of Science from the following areas:

- Biology;
- Chemistry;
- Computing Science;
- Mathematics;
- Energy and Environment Science; and
- Physics.

Particular sets of science courses are designated as minor programs; see the listing of minor programs in Section 14.13. A unique minor is offered in computational science.

Liberal studies and non-science electives – 24 credit hours
The remaining 24 credit hours must be outside science.

Note: The program must include 36 credit hours in science courses at the third- and fourth-year level; of these, at least 12 credit hours must be at the fourth-year level.

No more than 42 credit hours may be taken at the first-year level.

14.10 Program information – Bachelor of Science (Honours) in Physics – Regular program and Co-operative Education program

14.10.1 General information

The BSc (Hons) in Physics provides a basic foundation in biology, chemistry, mathematics and physics, and a solid education in classical and modern physics.

The program meets the rapidly increasing demand for graduates with knowledge and skills in technology-oriented fields such as energy, materials science, microelectronics, health, optoelectronics and communication technologies.

The Physics program offers specializations in Energy and the Environment, Forensic Physics, and Medical Physics, as well as a general Physics degree (Comprehensive).

The Faculty of Science offers separate Honours BSc degrees in Applied and Industrial Mathematics and in Physics. Students, with interest in both disciplines, may wish to complete the academic requirements of both programs and be awarded a single degree, BSc (Honours) in Applied and Industrial Mathematics and Physics. Eligibility requirements and academic information can be obtained from the academic advisor.

14.10.2 Admission requirements

See Section 14.2.

14.10.3 Careers

Graduates from the BSc (Hons) in Physics will be positioned for careers in industry, government, optoelectronics, materials science and novel energy industries in the private and public sector. Many students will continue their physics studies in graduate MSc and PhD programs or combine their BSc with the university's Bachelor of Education in order to help to fill the need for science teachers in Ontario's secondary schools.

14.10.4 Program details and degree requirements – Bachelor of Science (Honours) in Physics

In addition to the regular program, an optional co-operative education program is available to students in Physics including Comprehensive, Energy and the Environment, Forensic Physics, and Medical Physics (see Section 14.3 for co-op program details).

The requirements for the regular and co-operative education programs are detailed in the following program maps. Although reasonable efforts will be made to adhere to the following program maps, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at **www.science.uoit.ca**.

14.10.4.1 Physics – Comprehensive

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1030U Introduction to Computer Science with C++
MATH 1000U Introductory Calculus+ or
  MATH 1010U Calculus I+
PHY 1010U Physics I+ or
  PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II or
CHEM 1020U Chemistry II
MATH 1020U Calculus II
MATH 2050U Linear Algebra
PHY 1020U Physics II
Elective**

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
MATH 2010U Calculus III
PHY 2030U Mechanics I
PHY 2060U Nuclear Physics and Relativity
STAT 2010U Statistics and Probability for Physical Science

Semester 2 (15 credit hours)
MATH 2060U Differential Equations
PHY 2010U Electricity and Magnetism I
PHY 2040U Mechanics II
PHY 2050U Thermodynamics and Heat Transfer
Elective** (MATH 2020U Calculus IV recommended)

YEAR 3 – Regular program

Semester 1 (15 credit hours)
PHY 2020U Electricity and Magnetism II
PHY 3010U Statistical Mechanics I
PHY 3020U Quantum Mechanics I
PHY 3050U Waves and Optics
Elective**

Semester 2 (15 credit hours)
PHY 3030U Electronics
PHY 3040U Mathematical Physics
PHY 3060U Fluid Mechanics
Two electives **

YEAR 4 – Regular program

Semester 1 (15 credit hours)
PHY 4020U Quantum Mechanics II
PHY 4410U Physics Thesis Project I*** or Senior Science elective***
Senior Physics elective**
Two electives **

Semester 2 (15 credit hours)
PHY 4010U Statistical Mechanics II
PHY 4030U Modern Physics
PHY 4420U Physics Thesis Project II*** or Senior Science elective***
Two electives **

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
MATH 2010U Calculus III
PHY 2030U Mechanics I
PHY 2060U Nuclear Physics and Relativity
STAT 2010U Statistics and Probability for Physical Science

Semester 2 (15 credit hours)
MATH 2060U Differential Equations
PHY 2010U Electricity and Magnetism I
PHY 2040U Mechanics II
PHY 2050U Thermodynamics and Heat Transfer
Elective** (MATH 2020U Calculus IV recommended)

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
PHY 2020U Electricity and Magnetism II
PHY 3010U Statistical Mechanics I
PHY 3020U Quantum Mechanics I
PHY 3050U Waves and Optics
Elective**

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
PHY 3030U Electronics
PHY 3040U Mathematical Physics
PHY 3060U Fluid Mechanics
Two electives **

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
PHY 4020U Quantum Mechanics II
PHY 4410U Physics Thesis Project I*** or
Senior Science elective***
Senior Physics elective**
Two electives **

Semester 2 (15 credit hours)
PHY 4010U Statistical Mechanics II
PHY 4030U Modern Physics
PHY 4420U Physics Thesis Project II*** or
Senior Science elective***
Two electives **

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete 30 elective credit hours including one senior physics elective. Students not accepted to take PHY 4410U and PHY 4420U must take an additional two senior science electives for a total of 36 elective credit hours. At least 9 elective credit hours must be in science courses offered by the Faculty of Science including one senior physics elective. The additional two senior science electives, if taken in place of PHY 4410U and PHY 4420U, cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in Physics (PHY) courses; at least 12 elective credit hours must be in courses outside the Faculty of Science.

*****Thesis Project or senior science courses**
Students in clear academic standing who have completed 90 credit hours of their program and six third-year required PHY courses may optionally apply to take a two-course sequence consisting of PHY 4410U and PHY 4420U (Physics Thesis Project I and II). Students not accepted to take the thesis courses must complete two additional senior science electives instead. A senior science elective is defined as any 3000- or 4000-level science course not specified in the program map, excluding SCIE and ENVS courses. A student meeting the above requirements who does not take PHY 4410U and PHY 4420U may optionally apply to take PHY 4430U (Directed Studies in Physics) as one of the required senior science electives. Opportunities for the Thesis Project and Directed Studies options are limited; students must apply through Science Advising by April 30 following completion of the first three years of the program.

Recommended senior science electives that students may choose to take include:

CSCI 3010U Simulation and Modelling
CSCI 3070U Analysis and Design of Algorithms
CSCI 3090U Scientific Visualization and Computer Graphics
MATH 3040U Optimization
MATH 3050U Mathematical Modelling
MATH 3060U Complex Analysis
MATH 3070U Algebraic Structures
MATH 4050U Partial Differential Equations
STAT 3010U Biostatistics
PHY 4050U Emerging Energy Systems
PHY 4040U Solar Energy and Photovoltaics
PHY 4080U Hydrogen-Based Energy Systems and Fuel Cells

14.10.4.2 Physics – Energy and the Environment specialization

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1030U Introduction to Computer Science with C++
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
MATH 1020U Calculus II
MATH 2050U Linear Algebra
PHY 1020U Physics II

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
MATH 2010U Calculus III
PHY 2030U Mechanics I
PHY 2060U Nuclear Physics and Relativity
STAT 2010U Statistics and Probability for Physical Science

Semester 2 (15 credit hours)
ENVS 2010U Introductory Environmental Science
MATH 2060U Differential Equations
PHY 2010U Electricity and Magnetism I
PHY 2050U Thermodynamics and Heat Transfer
Elective** (PHY 2040U Mechanics II recommended)

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
MATH 2010U Calculus III
PHY 2030U Mechanics I
PHY 2060U Nuclear Physics and Relativity
STAT 2010U Statistics and Probability for Physical Science

Semester 2 (15 credit hours)
ENVS 2010U Introductory Environmental Science
MATH 2060U Differential Equations
PHY 2010U Electricity and Magnetism I
PHY 2050U Thermodynamics and Heat Transfer
Elective** (PHY 2040U Mechanics II recommended)

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 - Regular program

Semester 1 (15 credit hours)
ENVS 3020U Introductory Energy Science
PHY 2020U Electricity and Magnetism II
PHY 3010U Statistical Mechanics I
PHY 3020U Quantum Mechanics I
PHY 3050U Waves and Optics

Semester 2 (15 credit hours)
ENVS 3110U Economics and Politics of the Environment
PHY 3030U Electronics
PHY 3040U Mathematical Physics
PHY 3060U Fluid Mechanics
Elective**

YEAR 3 - Co-operative Education program

Semester 1 (15 credit hours)
ENVS 3020U Introductory Energy Science
PHY 2020U Electricity and Magnetism II
PHY 3010U Statistical Mechanics I
PHY 3020U Quantum Mechanics I
PHY 3050U Waves and Optics

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Regular program

Semester 1 (15 credit hours)
PHY 4040U Solar Energy and Photovoltaics
PHY 4050U Emerging Energy Systems
PHY 4410U Physics Thesis Project I*** or
Senior Science elective***
Senior Physics elective**
Elective** (MATH 3050U Mathematical Modeling recommended)

Semester 2 (15 credit hours)
PHY 4080U Hydrogen-Based Energy Systems and Fuel Cells
PHY 4420U Physics Thesis Project II*** or
Senior Science elective***
Senior Physics elective**
Two electives **

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
ENVS 3110U Economics and Politics of the Environment
PHY 3030U Electronics
PHY 3040U Mathematical Physics
PHY 3060U Fluid Mechanics
Elective**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
PHY 4040U Solar Energy and Photovoltaics
PHY 4050U Emerging Energy Systems
PHY 4410U Physics Thesis Project I*** or
Senior Science elective***
Senior Physics elective**
Elective** (MATH 3050U Mathematical Modeling recommended)

Semester 2 (15 credit hours)
PHY 4080U Hydrogen-Based Energy Systems and Fuel Cells
PHY 4420U Physics Thesis Project II*** or
Senior Science elective***
Senior Physics elective**
Two electives **

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
Students must complete 21 elective credit hours, including 6 credit hours in senior physics electives. Students not accepted to take PHY 4410U and PHY 4420U must take an additional two senior science electives for a total of 27 elective credit hours. In order to satisfy breadth requirements, the remaining 15 elective credit hours may not include physics (PHY) courses, and at least 9 credit hours must be in courses outside the Faculty of Science.

*****Thesis project or senior science courses**
Students in clear academic standing who have completed 90 credit hours of their program and six third-year required PHY courses may optionally apply to take a two-course sequence consisting of PHY 4410U and PHY 4420U (Physics Thesis Project I and II). Students not accepted to take the thesis courses must complete two additional senior science electives instead. A senior science elective is defined as any 3000- or 4000-level science course not specified in the program map, excluding SCIE and ENVS courses. A student meeting the above requirements who does not take PHY 4410U and PHY 4420U may optionally apply to take PHY 4430U (Directed Studies in Physics) as one of the required senior science electives. Opportunities for the Thesis Project and Directed Studies options are limited; students must apply through Science Advising by April 30 following completion of the first three years of the program.

Recommended senior science electives that students in Physics – Energy and the Environment program may choose to take include:

CSCI 3010U Simulation and Modelling
CSCI 3070U Analysis and Design of Algorithms
CSCI 3090U Scientific Visualization and Computer Graphics
MATH 3040U Optimization
MATH 3050U Mathematical Modelling

MATH 3060U Complex Analysis
MATH 3070U Algebraic Structures
MATH 4050U Partial Differential Equations
STAT 3010U Biostatistics
PHY 4020U Quantum Mechanics II
PHY 4010U Statistical Mechanics II

14.10.4.3 Physics – Forensic Physics specialization

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1030U Introduction to Computer Science with C++
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
CHEM 1020U Chemistry II
FSCI 1010U Introduction to Forensic Science
MATH 2050U Linear Algebra
MATH 1020U Calculus II
PHY 1020U Physics II

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
FSCI 2010U Crime Scene Science
MATH 2010U Calculus III
PHY 2030U Mechanics I
STAT 2010U Statistics and Probability for Physical Science

Semester 2 (15 credit hours)
BIOL 1020U Biology II
MATH 2060U Differential Equations
PHY 2010U Electricity and Magnetism I
PHY 2050U Thermodynamics and Heat Transfer
Elective** (PHY 2040U Mechanics II recommended)

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
CSCI 2000U Introduction to Mathematical Computation
FSCI 2010U Crime Scene Science
MATH 2010U Calculus III
PHY 2030U Mechanics I
STAT 2010U Statistics and Probability for Physical Science

Semester 2 (15 credit hours)
BIOL 1020U Biology II
MATH 2060U Differential Equations
PHY 2010U Electricity and Magnetism I
PHY 2050U Thermodynamics and Heat Transfer
Elective** (PHY 2040U Mechanics II recommended)

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Regular program

Semester 1 (15 credit hours)
FSCI 3010U Criminalistics I
PHY 2020U Electricity and Magnetism II
PHY 3010U Statistical Mechanics I
PHY 3020U Quantum Mechanics I
PHY 3050U Waves and Optics

Semester 2 (15 credit hours)
PHY 3030U Electronics
PHY 3040U Mathematical Physics
PHY 3060U Fluid Mechanics
Two electives**

YEAR 4 – Regular program

Semester 1 (15 credit hours)
PHY 2060U Nuclear Physics and Relativity
PHY 4020U Quantum Mechanics II
PHY 4410U Physics Thesis Project I*** or
Senior Science elective***
Senior Physics elective**
Elective**

Semester 2 (15 credit hours)
FSCI 4050U Law for Forensic Scientists
PHY 4120U Forensic Physics Applications
PHY 4010U Statistical Mechanics II
PHY 4030U Modern Physics
PHY 4420U Physics Thesis Project II*** or
Senior Science elective***

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
FSCI 3010U Criminalistics I
PHY 2020U Electricity and Magnetism II
PHY 3010U Statistical Mechanics I
PHY 3020U Quantum Mechanics I
PHY 3050U Waves and Optics

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
PHY 3030U Electronics
PHY 3040U Mathematical Physics
PHY 3060U Fluid Mechanics
Two electives**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
PHY 2060U Nuclear Physics and Relativity
PHY 4020U Quantum Mechanics II
PHY 4410U Physics Thesis Project I*** or
Senior Science elective***
Senior Physics elective**
Elective**

Semester 2 (15 credit hours)
FSCI 4050U Law for Forensic Scientists
PHY 4120U Forensic Physics Applications
PHY 4010U Statistical Mechanics II
PHY 4030U Modern Physics
PHY 4420U Physics Thesis Project II*** or
Senior Science elective***

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete 15 elective credit hours including one senior physics elective. Students not accepted to take both PHY 4410U and PHY 4420U must take an additional two senior science electives for a total of 21 elective credit hours. At least 3 elective credit hours must be in a mathematics course at the second-year (MATH 2000-series) or higher level not explicitly specified in the program map. The additional two senior science electives, if taken in place of PHY 4410U and PHY 4420U, cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in Physics (PHY) courses; at least 12 elective credit hours must be in courses outside the Faculty of Science.

*****Thesis project or senior science elective courses**
Students in clear academic standing who have completed 90 credit hours of their program and six third-year required PHY courses may optionally apply to take a two-course sequence consisting of PHY 4410U and PHY 4420U (Physics Thesis Project I and II). Students not accepted to take the thesis courses must complete two additional senior science electives instead. A senior science elective is defined as any 3000- or 4000-level science course not specified in the program map, excluding SCIE and ENVS courses. A student meeting the above requirements who does not take PHY 4410U and PHY 4420U may optionally apply to take PHY 4430U (Directed Studies in Physics) as one of the required senior science electives. Opportunities for the Thesis Project and Directed Studies options are limited; students must apply through Science Advising by April 30 following completion of the first three years of the program.

Recommended senior science electives that students may choose to take include:

CSCI 3010U Simulation and Modelling
CSCI 3070U Analysis and Design of Algorithms
CSCI 3090U Scientific Visualization and Computer Graphics
MATH 3040U Optimization
MATH 3050U Mathematical Modelling
MATH 3060U Complex Analysis
MATH 3070U Algebraic Structures
MATH 4050U Partial Differential Equations
STAT 3010U Biostatistics
PHY 4020U Quantum Mechanics II
PHY 4010U Statistical Mechanics II
PHY 4030U Modern Physics
PHY 4050U Emerging Energy Systems
PHY 4040U Solar Energy and Photovoltaics
PHY 4080U Hydrogen-Based Energy Systems and Fuel Cells

14.10.4.4 Physics – Medical Physics specialization

YEAR 1 – Regular program and Co-operative Education program

Semester 1 (15 credit hours)
BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1030U Introduction to Computer Science with C++
MATH 1000U Introductory Calculus+ or
MATH 1010U Calculus I+
PHY 1010U Physics I+ or
PHY 1030U Introductory Physics+

Semester 2 (15 credit hours)
BIOL 1020U Biology II
CHEM 1020U Chemistry II
MATH 2050U Linear Algebra
MATH 1020U Calculus II
PHY 1020U Physics II

+All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

YEAR 2 – Regular program

Semester 1 (15 credit hours)
BIOL 2030U Cell Biology
CSCI 2000U Introduction to Mathematical Computation
MATH 2010U Calculus III
PHY 2030U Mechanics I
PHY 2060U Nuclear Physics and Relativity

YEAR 2 – Co-operative Education program

Semester 1 (15 credit hours)
BIOL 2030U Cell Biology
CSCI 2000U Introduction to Mathematical Computation
MATH 2010U Calculus III
PHY 2030U Mechanics I
PHY 2060U Nuclear Physics and Relativity

YEAR 2 – Regular program

Semester 2 (15 credit hours)
MATH 2060U Differential Equations
PHY 2010U Electricity and Magnetism I
PHY 2050U Thermodynamics and Heat Transfer
Two electives**

YEAR 3 – Regular program

Semester 1 (15 credit hours)
PHY 2020U Electricity and Magnetism II
PHY 3010U Statistical Mechanics I
PHY 3020U Quantum Mechanics I
PHY 3050U Waves and Optics
STAT 2010U Statistics and Probability for Physical Science

Semester 2 (15 credit hours)
PHY 3030U Electronics
PHY 3060U Fluid Mechanics
RADI 2100U Radiological and Health Physics
RADI 2110U Health Physics Laboratory
Elective**

YEAR 4 – Regular program

Semester 1 (15 credit hours)
PHY 4100U Medical Imaging
PHY 4410U Physics Thesis Project I*** or Senior Science elective***
RADI 4440U Radioisotopes and Radiation Machines
Senior Physics elective**
Elective**

Semester 2 (15 credit hours)
PHY 4420U Physics Thesis Project II*** or Senior Science elective***
RADI 4220U Radiation Biophysics and Dosimetry
RADI 4320U Medical Applications of Radiation Techniques
Two electives**

YEAR 2 – Co-operative Education program

Semester 2 (15 credit hours)
MATH 2060U Differential Equations
PHY 2010U Electricity and Magnetism I
PHY 2050U Thermodynamics and Heat Transfer
Two electives**

Semester 3
SCCO 1000W Co-op Work Term I*

YEAR 3 – Co-operative Education program

Semester 1 (15 credit hours)
PHY 2020U Electricity and Magnetism II
PHY 3010U Statistical Mechanics I
PHY 3020U Quantum Mechanics I
PHY 3050U Waves and Optics
STAT 2010U Statistics and Probability for Physical Science

Semester 2
SCCO 2000W Co-op Work Term II*

Semester 3
SCCO 3000W Co-op Work Term III*

YEAR 4 – Co-operative Education program

Semester 1
SCCO 4000W Co-op Work Term IV*

Semester 2 (15 credit hours)
PHY 3030U Electronics
PHY 3060U Fluid Mechanics
RADI 2100U Radiological and Health Physics
RADI 2110U Health Physics Laboratory
Elective**

Semester 3
SCCO 5000W Co-op Work Term V*

YEAR 5 – Co-operative Education program

Semester 1 (15 credit hours)
PHY 4100U Medical Imaging
PHY 4410U Physics Thesis Project I*** or Senior Science elective***
RADI 4440U Radioisotopes and Radiation Machines
Senior Physics elective**
Elective**

Semester 2 (15 credit hours)
PHY 4420U Physics Thesis Project II*** or Senior Science elective***
RADI 4220U Radiation Biophysics and Dosimetry
RADI 4320U Medical Applications of Radiation Techniques
Two electives**

Notes:
No more than 42 credit hours may be taken at the first-year level.

*This course is graded on a pass/fail basis.

****Electives and breadth requirements**
All students must complete a total of 21 elective credit hours including one senior physics elective. Students not accepted to take PHY 4410U and PHY 4420U must take an additional two senior science electives for a total of 27 credit hours. At least 9 credit hours must be in courses offered by the Faculty of Science including one senior physics elective; the additional two senior science electives, if taken in place of PHY 4410U and PHY 4420U, cannot be used to meet this requirement. In order to satisfy breadth requirements, no more than 9 elective credit hours may be in Physics (PHY) courses; at least 12 credit hours must be in courses outside the Faculty of Science. Students with interest in medical school should take a full year of organic chemistry (CHEM 2020U Introduction to Organic Chemistry and CHEM 2120U Organic Chemistry).

*****Thesis project or senior science elective courses**
Students in clear academic standing who have completed 90 credit hours of their program and six third-year required PHY courses may optionally apply to take a two-course sequence consisting of PHY 4410U and PHY 4420U (Physics Thesis Project I and II). Students not accepted to take the thesis courses must complete two additional senior science electives instead. A senior science elective is defined as any 3000- or 4000-level science course not specified in the program map, excluding SCIE and ENVS courses. A student meeting the above requirements who does not take PHY 4410U and PHY 4420U may optionally apply to take PHY 4430U (Directed Studies in Physics) as one of the required senior science electives. Opportunities for the Thesis Project and Directed Studies options are limited; students must apply through Science Advising by April 30 following completion of the first three years of the program.

Recommended senior science electives that students may choose to take include:

CSCI 3010U Simulation and Modelling
CSCI 3070U Analysis and Design of Algorithms
CSCI 3090U Scientific Visualization and Computer Graphics
MATH 3040U Optimization
MATH 3050U Mathematical Modelling
MATH 3060U Complex Analysis
MATH 3070U Algebraic Structures
MATH 4050U Partial Differential Equations
STAT 3010U Biostatistics
PHY 4020U Quantum Mechanics II
PHY 4010U Statistical Mechanics II
PHY 4030U Modern Physics
PHY 4050U Emerging Energy Systems
PHY 4040U Solar Energy and Photovoltaics
PHY 4080U Hydrogen-Based Energy Systems and Fuel Cells

14.11 Science and Management programs

14.11.1 General information

UOIT’s Bachelor of Science and Management (Honours) is available to students in any specialization within the Biological Science program or the Physical Science program. The combination Science and Management program will consist of the curriculum from the selected science program and 10 courses in business and management that are taken in Year 5 of the regular program or Year 6 of the co-op program. Graduates will benefit from a complete science education complemented by solid accounting, finance, operations, human resources and marketing skills.

14.11.2 Admission requirements

See Section 14.2.

14.11.3 Careers

There is a wealth of opportunities for graduates in the sciences in industry, government, and in fields of applied science, and the combination of a science degree and business and management education will give an added advantage to graduates of these programs to establish careers in practical areas.

14.11.4 Program overview and degree requirements

Bachelor of Science and Management (Honours) in Biological Science and Management – BSc and Mgt (Hons) including Co-operative Education

- Complementary Studies;
- Environmental Toxicology specialization;
- Life Sciences specialization; and
- Pharmaceutical Biotechnology specialization.

Bachelor of Science and Management (Honours) in Physical Science and Management – BSc and Mgt (Hons) including Co-operative Education

The Science and Management programs follow the same program map as the four-year degree regular program and the five-year co-operative education program for each specialization with the addition of the following 10 courses in Year 5 or 6 respectively.

YEAR 5

Semester 1 (15 credit hours)
BUSI 1101U Financial Accounting
BUSI 2201U Marketing I
BUSI 2311U Organizational Behaviour
BUSI 2401U Finance I
BUSI 2603U Introduction to Operations Management

Semester 2 (15 credit hours)
BUSI 2170U Managerial Accounting
BUSI 2402U Finance II
BUSI 2202U Marketing II
BUSI 2312U Introduction to Human Resources Management
BUSI 2604U Introduction to Project Management and Supply Chain Management

14.12 Concurrent Education program

14.12.1 General information

A five-year Concurrent Education program and six-year co-op program is offered in collaboration with the Faculty of Education.

The Concurrent Education program allows students to complete a four-year Honours Bachelor of Science or a five-year Honours Bachelor of Science (Co-operative Education) and a Bachelor of Education simultaneously.

14.12.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with a minimum overall average of 75 per cent on six 4U or 4M credits including English (ENG4U), Advanced Functions (MHF4U), and two of Biology (SBI4U), Calculus and Vectors (MCV4U), Chemistry (SCH4U), or Physics (SPH4U). In addition, a combined minimum 75 per cent average in mathematics and science courses is required. It is recommended that all four MCV4U, SBI4U, SCH4U and SPH4U be taken. All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission. A clear criminal record check and a Tuberculin (TB) test are post-admission requirements.

14.12.3 Careers

Graduates will be prepared to teach in the Ontario education system where the demand for teachers of mathematics, science and computer science is on the rise. Graduates are also prepared to teach outside the province and some may be able to teach at the college-level or to undertake roles in business in the areas of training and professional development. The university's concurrent education programs are designed to meet all Ontario regulatory requirements and incorporate the Standards of Practice and Ethical Standards for the Teaching Profession of the Ontario College of Teachers. Graduates will be recommended by UOIT to the Ontario College of Teachers for certification to practice in the Ontario education system.

14.12.4 Program details and degree requirements

The first year of the Concurrent Science/Education program has similar science content to that of the science programs; concurrent education students will also take EDUC 2900U Introduction to Teaching and Field Experience in year one, semester two of the science programs. The detailed program maps for each possible teachable subject combination can be found on the Faculty of Science website at **www.science.uoit.ca** or the Faculty of Education's website at **www.education.uoit.ca**.

In addition to the regular program, an optional co-operative education program is available to students in Concurrent Science/Education. Section 14.3 provides general co-op program information. Concurrent Science/Education students interested in the co-op program should meet with the science academic advisor and the associate dean for specific information and to discuss their program map.

14.13 Science minor programs

14.13.1 Biology, Chemistry, Mathematics and Physics minors

General requirements: A student must take a minimum of 18 credit hours in courses with the designation BIOL, CHEM, MATH or PHY respectively, of which at least three credit hours must be taken as science electives (i.e. not be required by the major program) and at least six must be at the 3000- or 4000-level. If all the courses in a minor group are required by the major program, one additional course in the minor subject must be taken to satisfy the elective rule above. A cumulative GPA of at least 2.0 in the minor subject courses is required to successfully complete a minor program.

Note: Suggested course groups for minors in Biology and Chemistry follow; students may choose to follow these course groups, or develop other course groups in consultation with the Faculty of Science academic advisor.

Specific courses are required for the minor programs in Computational Science, Mathematics and Physics. A list of courses follows.

14.13.1.1 Biology

Two mandatory courses: BIOL 1010U; and BIOL 1020U.

One of the following groups of four or five courses (themes indicated in parentheses):

- BIOL 2020U; BIOL 2030U; BIOL 3030U; BIOL 3050U (Microbiology and Developmental Biology); or
- BIOL 2010U; BIOL 2020U; BIOL 2030U; BIOL 3030U; BIOL 3040U (Microbiology and Physiology); or
- BIOL 2020U; BIOL 2030U; BIOL 2040U; BIOL 3010U; BIOL 3050U (Molecular and Developmental Biology); or
- BIOL 2020U; BIOL 2030U; BIOL 2040U; BIOL 3010U; BIOL 3030U (Molecular Biology and Microbiology); or
- BIOL 2010U; BIOL 2020U; BIOL 2040U; BIOL 3010U; BIOL 3020U (Molecular Biology and Toxicology); or
- BIOL 2010U; BIOL 2020U; BIOL 2030U; BIOL 3040U; BIOL 3050U (Physiology and Developmental Biology); or
- BIOL 2010U; BIOL 2030U; BIOL 2040U; BIOL 3020U; BIOL 3040U (Physiology and Toxicology).

Other course groups may be developed in consultation with the science academic advisor, subject to the general rules above.

14.13.1.2 Chemistry

Two mandatory courses: CHEM 1010U; and CHEM 1020U.

One of the following groups of four courses (themes indicated in parentheses):

- CHEM 2010U or CHEM 2040U; CHEM 2030U; CHEM 3530U; CHEM 3540U (Analytical Chemistry); or
- CHEM 2010U; CHEM 2020U or CHEM 2030U or CHEM 2130U or CHEM 2040U; CHEM 3510U; CHEM 3520U (Inorganic Chemistry); or
- CHEM 2020U; CHEM 2120U; CHEM 3120U; CHEM 3220U (Organic Chemistry); or
- CHEM 2010U; CHEM 2040U; CHEM 3040U; CHEM 4040U (Physical Chemistry).

Other course groups may be developed in consultation with the science academic advisor, subject to the general rules above.

14.13.1.3 Mathematics

Four mandatory courses: MATH 1010U; MATH 1020U; MATH 2010U; and MATH 2050U.

Two additional courses selected from the following:

MATH 3020U; MATH 3040U; MATH 3050U; MATH 3060U; MATH 3070U; MATH 4010U.

Note: Some of the selected courses will require one or more additional MATH or STAT 2000-series courses to be taken as prerequisites.

14.13.1.4 Physics

Four mandatory courses: PHY 1010U or PHY 1030U; PHY 1020U or PHY 1040U; PHY 2010U; PHY 2030U.

Two additional courses selected from the following:

PHY 3010U; PHY 3020U; PHY 3030U; PHY 3040U; PHY 3050U; PHY 3060U; PHY 4010U; PHY 4020U.

Note: Some of the selected courses will require an additional PHY or MATH 2000-series course to be taken as a prerequisite.

14.13.2 Computational Science minor

A minor consisting of 24 credit hours is available in Computational Science. The new discipline of computational science has emerged primarily over the past decade as a third methodology for carrying out scientific investigations, alongside the traditional approaches of theory and experiment.

Computational science combines the application of numerical methods, mathematical models, and computer algorithms, with knowledge in a particular discipline to study problems that are intractable or difficult to study using conventional approaches. Examples include the study of stock market collapses, the evolution of interstellar galaxies, and the molecular-level properties of nanomaterials.

Computational science seeks to gain insight through the development and implementation of mathematical models of phenomena by means of their computer simulation. Visualization of the results of such simulations is a key ingredient in the methodology. This minor may be combined with any of the UOIT science degree programs. Students with this minor can expect to enhance their opportunities in the marketplace. A cumulative GPA of at least 2.0 in the following courses is required to successfully complete this minor program.

Course requirements:

- CSCI 1000U Scientific Computing Tools;
- CSCI 1030U Introduction to Computer Science;
- CSCI 2010U Principles of Computer Science;
- CSCI 2110U Discrete Structures in Computer Science or MATH 2080U Discrete Mathematics;
- CSCI 3010U Simulation and Modelling
- CSCI 3090U Scientific Visualization and Computer Graphics;
- MATH 2072U Computational Science I; and
- MATH 4020U Computational Science II.

SECTION 15: FACULTY OF SOCIAL SCIENCE AND HUMANITIES

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Associate deans:

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Brian Cutler, BA, MA, PhD

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Lecturers:

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Steven Hutchinson, BA, MA, PhD

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15.1 Degrees offered

Bachelor of Arts (Honours) in Communication – BA (Hons)

- Comprehensive program;
- Commerce and Marketing specialization;
- Digital Media specialization;
- Health Science specialization;
- Science and Technology specialization; and
- Bridge program.

Bachelor of Arts (Honours) in Community Development – BA (Hons)

- Comprehensive program.

Bachelor of Arts (Honours) in Criminology and Justice – BA (Hons)

- Comprehensive program;
- Criminal Justice specialization;
- Gender, Sexualities and Justice specialization;
- Race, Ethnicity and Justice specialization;
- Youth, Crime and Justice specialization;
- Criminology and Justice minor; and
- Bridge program.

Bachelor of Arts (Honours) in Forensic Psychology – BA (Hons)

- Comprehensive program.

Bachelor of Arts (Honours) in Legal Studies – BA (Hons)

- Comprehensive program;
- Alternative Dispute Resolution specialization;
- Human Rights Law specialization;
- Information Law specialization;
- Legal Studies minors; and
- Bridge program.

Bachelor of Arts (Honours) in Public Policy – BA (Hons)

- Comprehensive program;
- Equity Policy specialization; and
- Technology in Society specialization.

The Faculty of Social Science and Humanities offers Bachelor of Arts (Honours) degree programs in Communication, Community Development, Criminology and Justice, Forensic Psychology, Legal Studies, and Public Policy. The specializations within each program are designed to provide students with a broad range of skills required in a variety of fields. Through the application of theory and hands-on activities, students develop the knowledge, holistic thinking, teamwork and interpersonal skills that are essential for success in the 21st century.

The faculty offers Bridge programs in Communication, Criminology and Justice, and Legal Studies. These programs enable college graduates to apply specific diplomas toward Bachelor of Arts degrees.

15.2 Program information – Bachelor of Arts (Honours) in Communication

15.2.1 General information

The Bachelor of Arts in Communication (Honours) program offers a four-year professionally focused program that combines theory, skills, knowledge and professional practice in order to provide students with the tools they need to succeed in today's knowledge-driven and communications-based world. Developed in consultation with business, industry, and government leaders, the program emphasizes leadership, collaboration, and management skills at the same time as it introduces the latest technological advances in new media and relates them to social and political change. Students in the Communication program will have the opportunity to pursue the Comprehensive program or to choose one of four areas of specialization.

15.2.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M courses, including English (ENG4U). All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

15.2.3 Field placement opportunities

This program offers some students the opportunity to engage in a short, contracted learning partnership with businesses and agencies in the Durham region.

15.2.4 Careers

Due to increasing market demand, communication is one of the fastest growing areas of study in Canada. It is an interdisciplinary field that opens up possibilities for careers with business, government and public organizations, including communications director, information officer, professional writer/editor, media manager, journalist, multimedia developer, web communications manager, public relations specialist, project co-ordinator, marketing manager, advertising executive, e-commerce manager, and many more.

15.2.5 Degree requirements

To be eligible for the BA (Hons) degree in Communication, students must successfully complete 120 credit hours, as outlined in the following program maps. For course descriptions, see Section 16.

Students may take the Comprehensive program or choose a specialization in Commerce and Marketing, Digital Media, Health Science, or Science and Technology.

15.2.6 Bachelor of Arts (Honours) in Communication – Comprehensive program

To be eligible for the BA (Hons) degree in Communication, students must successfully complete 120 credit hours, including all courses outlined in the following program maps. Each year prior to course registration the order and timing of course offerings will be released by the faculty and communicated to students. For course descriptions, see Section 16.

YEAR 1 (**30 credit hours**)

COMM 1100U Introduction to Communication
COMM 1110U Developments in Human Communication
COMM 1220U Reading Our World
COMM 1310U Fundamentals of Professional Writing
COMM 1320U Oral Communication and Public Speaking
COMM 1610U Interpersonal Communication
Four general electives*†

†**Note:** COMM 1420U Computer Skills should be taken as an elective in the first semester by those needing extra preparation in computer skills.

YEAR 2 (**30 credit hours**)

COMM 2110U Foundations of Communication Theory
COMM 2210U Communication and Culture
COMM 2310U Advanced Professional Writing and Editing
COMM 2410U Communication and Technology
COMM 2411U Computer-mediated Communication
COMM 2510U Business Communication
Three general electives*
Communication elective+

+**Communication electives:**
Must take one of:
COMM 2220U The Media and Communications in Canada
COMM 2230U Film and Video
COMM 2240U Television
COMM 2250U Mass Communication and Popular Culture
COMM 2260U Language, Culture and Society

Note: Not all of the listed electives will be offered every year.

YEAR 3 (**30 credit hours**)

COMM 3110U Communication Ethics
COMM 3410U Web Design/Multimedia Authoring
COMM 3510U Organizational Communication
COMM 3610U Persuasion, Argumentation and Negotiation
COMM 3710U Intercultural Communication
One of: COMM 3310U Writing for Publication or COMM 3320U Writing for Business and Government or COMM 3330U Scientific and Technical Writing
Three general electives*
Communication elective++

++**Communication electives:**
Must take one of:
COMM 3520U Public Relations
COMM 3530U Advertising and Marketing Communication
COMM 3420U Human-Computer Interaction
COMM 3720U Communicating Diversity: Race, Ethnicity and Gender

Note: Not all of the listed electives will be offered every year.

YEAR 4 (30 credit hours)

COMM 4110U Communication Research in Practice
COMM 4120U Senior Seminar: Professional Practice
COMM 4130U Capstone Project
COMM 4610U Mediation and Conflict Management
COMM 4710U Globalization and International Communication
Three general electives*
Two Communication electives+++

+++**Communication electives:**
Must take two of:
COMM 3310U Writing for Publication or COMM 3320U Writing for Business and Government or
COMM 3330U Scientific and Technical Writing
COMM 4140U Rhetoric
COMM 4210U Interpretive Practices
COMM 4510U Strategic Management Communication
COMM 4520U Advanced Business Communication
COMM 4530U Communications Consulting
COMM 4720U Communication for Social Change
COMM 4810U Special Topics: Internship

15.2.7 Program details – Commerce and Marketing specialization

This specialization is of particular use to students who are planning on a career in the broad area of business and marketing.

YEAR 1 (30 credit hours)

BUSI 1600U Management of the Enterprise
BUSI 1700U Introduction to Entrepreneurship
COMM 1100U Introduction to Communication
COMM 1110U Developments in Human Communication
COMM 1220U Reading Our World
COMM 1310U Fundamentals of Professional Writing
COMM 1320U Oral Communication and Public Speaking
COMM 1610U Interpersonal Communication
Two general electives*†

†**Note:** COMM 1420U Computer Skills should be taken as an elective in the first semester by those needing extra preparation in computer skills.

YEAR 2 (30 credit hours)

BUSI 1101U Financial Accounting
BUSI 2050U Economics for Professionals
COMM 2110U Foundations of Communication Theory
COMM 2210U Communication and Culture
COMM 2310U Advanced Professional Writing and Editing
COMM 2410U Communication and Technology
COMM 2411U Computer-mediated Communication
COMM 2510U Business Communication or
BUSI 3200U Marketing Communications (offered in alternate years)
General elective*
Communication or Business elective+

+Communication electives/Business electives:
Must take one of:
BUSI 2205U Principles of Marketing
BUSI 2312U Introduction to Human Resources Management
BUSI 3502U E-Commerce
COMM 2220U Media and Communications in Canada
COMM 2260U Language, Culture and Society

YEAR 3 (30 credit hours)

COMM 3110U Communication Ethics
COMM 3320U Writing for Business and Government
COMM 3410U Web Design/Multimedia Authoring
COMM 3510U Organizational Communication
COMM 3530U Advertising and Marketing Communication
(cross-listed with BUSI 4203U Advertising Management)
COMM 3610U Persuasion, Argumentation and Negotiation
COMM 3710U Intercultural Communication
General elective*
Two Communication electives or Business electives++

++Communication electives/Business electives:
Must take two of:
BUSI 3210U Consumer Behaviour
BUSI 3220U Sales Management
BUSI 3305U Recruiting and Selection
BUSI 3330U The Management of Change
BUSI 3340U Human Resource Planning
BUSI 3350U Developing Management Skills
COMM 3420U Human-Computer Interaction
COMM 3520U Public Relations

YEAR 4 (30 credit hours)

COMM 4110U Communication Research in Practice
COMM 4120U Senior Seminar – Professional Practice
COMM 4130U Capstone Project
COMM 4610U Mediation and Conflict Management
COMM 4710U Globalization and International Communication
Two general electives*
Three Communication electives or Business electives+++

+++Communication electives/Business electives:
Must take three of:
BUSI 4203U Advertising Management
BUSI 4220U Marketing Strategy
BUSI 4250U International Marketing
BUSI 4599U Directed Independent Studies in E-Business and E-Commerce
COMM 3310U Writing for Publication or
COMM 3330U Scientific and Technical Writing
COMM 4140U Rhetoric
COMM 4520U Advanced Business Communication
COMM 4530U Communications Consulting
COMM 4810U Special Topics: Internship
COMM 4510U Strategic Management Communication or
BUSI 3700U Strategic Management for Professionals

***Electives**

General electives
General electives can be taken at/or adjoining their year level, where permission has been granted and prerequisites have been fulfilled. No more than six 1000-level elective courses can be included.

Communication electives
See each separate year for listings of options. Courses from adjoining years can be chosen with permission of the academic advisor. Communication electives may be chosen as general electives.

Note: Not all of the listed electives will be offered every year.

15.2.8 Program details – Digital Media specialization

This specialization is for students interested in new media who plan on careers in that specific field. Due to the nature of the specialization, students must have experience with computers and related technologies.

YEAR 1 (30 credit hours)

COMM 1100U Introduction to Communication
COMM 1110U Developments in Human Communication
COMM 1220U Reading Our World
COMM 1310U Fundamentals of Professional Writing
COMM 1320U Oral Communication and Public Speaking
COMM 1610U Interpersonal Communication
CSCI 1030U Introduction to Computer Science
CSCI 1200U Computers and Media
Two general electives*

YEAR 2 (30 credit hours)

COMM 2110U Foundations of Communication Theory
COMM 2210U Communication and Culture
COMM 2310U Advanced Professional Writing and Editing
COMM 2410U Communication and Technology
COMM 2411U Computer-mediated Communication
COMM 2510U Business Communication
CSCI 2200U Narrative Structure in the Digital Age
INFR 1320U Graphic Design II
General elective*
Communication elective+

+Communication electives:
Must take one of:
COMM 2220U The Media and Communications in Canada
COMM 2230U Film and Video or INFR 3320U Filmmaking
COMM 2240U Television
COMM 2260U Language, Culture and Society

Note: Not all of the listed electives will be offered every year.

YEAR 3 (30 credit hours)

COMM 3110U Communication Ethics
COMM 3330U Scientific and Technical Writing
COMM 3510U Organizational Communication
COMM 3610U Persuasion, Argumentation and Negotiation
COMM 3710U Intercultural Communication
CSCI 2160U Digital Media
CSCI 3210U Internet Based Media
General elective*
Two Communication electives++

++Communication electives:
Must take two of:
COMM 3420U Human-Computer Interaction
COMM 3520U Public Relations
COMM 3530U Advertising and Marketing Communication

Note: Not all of the listed electives will be offered every year.

YEAR 4 (**30 credit hours**)

COMM 4110U Communication Research in Practice
COMM 4120U Senior Seminar: Professional Practice
COMM 4130U Capstone Project
COMM 4610U Mediation and Conflict Management
COMM 4710U Globalization and International Communication
CSCI 3220U Digital Media Production
Two general electives*
Two Communication electives+++

+++**Communication electives:**
Must take two of:
COMM 4140U Rhetoric
COMM 4510U Strategic Management Communication
COMM 4520U Advanced Business Communication
COMM 4530U Communications Consulting
COMM 4810U Special Topics: Internship

15.2.9 Program details – Health Science specialization

This specialization provides a broad health science background for graduates intending to pursue communication employment opportunities in the health sciences sector. It provides students with a basis for understanding current issues within the health sector and prepares them to effectively communicate these issues to the general public.

YEAR 1 (**30 credit hours**)

COMM 1100U Introduction to Communication
COMM 1110U Developments in Human Communication
COMM 1220U Reading Our World
COMM 1310U Fundamentals of Professional Writing
COMM 1320U Oral Communication and Public Speaking
COMM 1610U Interpersonal Communication
Four general electives*†

†**Note:** COMM 1420U Computer Skills should be taken as an elective in the first semester by those needing extra preparation in computer skills.

YEAR 2 (**30 credit hours**)

COMM 2110U Foundations of Communication Theory
COMM 2210U Communication and Culture
COMM 2310U Advanced Professional Writing and Editing
COMM 2410U Communication and Technology
COMM 2411U Computer-mediated Communication
COMM 2510U Business Communication
HLSC 2800U Health and Wellness
HLSC 2801U Understanding Health Care and Therapeutics in Canada
General elective*
Communication elective or Health Science elective+

+**Communication electives/Health Science electives:**
Must take one of:
COMM 2220U The Media and Communications in Canada
COMM 2250U Mass Communication and Popular Culture
COMM 2260U Language, Culture and Society
HLSC 2201U Introduction to Health Information Management
HLSC 2601U Introduction to Health Management

Note: Not all of the listed electives will be offered every year.

YEAR 3 (30 credit hours)

COMM 3410U Web Design/Multimedia Authoring
COMM 3510U Organizational Communication
COMM 3610U Persuasion, Argumentation and Negotiation
COMM 3710U Intercultural Communication
HLSC 3800U Critical Appraisal of Statistics in Health Sciences
HLSC 3805U Introduction to Epidemiology
One of: COMM 3110U Communication Ethics or
HLSC 3710U Ethics
One of: COMM 3330U Scientific and Technical Writing or
COMM 3310U Writing for Publication or
COMM 3320U Writing for Business and Government
General elective*
Communication elective or Health Science elective++

++Communication electives/Health Science electives:
Must take one of:
COMM 3520U Public Relations
COMM 3530U Advertising and Marketing Communication
COMM 3720U Communicating Diversity: Race, Ethnicity and Gender
HLSC 3630U Health Finance
Any 3000- or 4000-level Health Science course

Note: Not all of the listed electives will be offered every year.

YEAR 4 (30 credit hours)

COMM 4110U Communication Research in Practice
COMM 4120U Senior Seminar: Professional Practice
COMM 4130U Capstone Project
COMM 4610U Mediation and Conflict Management
COMM 4710U Globalization and International Communication
HLSC 4850U Current Issues in Health Care
Two general electives*
Two Communication electives or Health Science electives+++

+++Communication electives/Health Science electives:
Must take two of:
COMM 4510U Strategic Management Communication
COMM 4520U Advanced Business Communication
COMM 4720U Communication for Social Change
COMM 4810U Special Topics: Internship
Any 3000- or 4000-level Health Science course

15.2.10 Program details – Science and Technology specialization

This specialization provides a broad science background for graduates intending to pursue communication employment opportunities in the science and technology sector. It provides students with an understanding of current issues within science and a deeper understanding of the issues involved in the biological and life sciences. Upon completing this specialization, students will understand the culture of science and will be able to effectively communicate scientific issues to the general public.

Students entering this specialization will have a strong interest in science and its importance in today’s technology-oriented economy. Students will be expected to have taken science courses at least to Grade 11 during their secondary school education.

YEAR 1 (30 credit hours)

COMM 1100U Introduction to Communication
COMM 1110U Developments in Human Communication
COMM 1220U Reading Our World
COMM 1310U Fundamentals of Professional Writing
COMM 1320U Oral Communication and Public Speaking
COMM 1610U Interpersonal Communication
Three general electives*
Science elective ◊

◊**Science electives:**
Must take at least one of:
BIOL 1010U Biology I: Molecular and Cellular Systems [fall term] (Prerequisite for BIOL 1020U)
BIOL 1020U Biology II: Diversity of Life and Principles of Ecology [winter term] (Prerequisite for BIOL 2010U, BIOL 2020U, BIOL 2030U)
BIOL 1840U Biology for Engineers [winter term] (Prerequisite for BIOL 2840U)

Note: Students will want to consider prerequisites when choosing their first science elective – please consult with your academic advisor.

YEAR 2 (**30 credit hours**)

COMM 2110U Foundations of Communication Theory
COMM 2210U Communication and Culture
COMM 2310U Advanced Professional Writing and Editing
COMM 2410U Communication and Technology
COMM 2411U Computer-mediated Communication
COMM 2510U Business Communication
General elective*
Communication elective+
Science elective◊◊

+**Communication electives:**
Must take one of:
COMM 2220U The Media and Communications in Canada
COMM 2230U Film and Video
COMM 2240U Television
COMM 2260U Language, Culture, and Society

◊◊**Science electives:**
Must take one of:
BIOL 2010U Introductory Physiology
BIOL 2020U Genetics and Molecular Biology
BIOL 2030U Cell Biology
BIOL 2840U Cell and Molecular Biology

YEAR 3 (**30 credit hours**)

COMM 3110U Communication Ethics
COMM 3330U Scientific and Technical Writing
COMM 3510U Organizational Communication
COMM 3610U Persuasion, Argumentation and Negotiation
COMM 3710U Intercultural Communication
SCIE 3010U Philosophy of Science
One of: COMM 3410U Web Design/Multimedia Authoring or
CSCI 3090U Scientific Visualization and Computer Graphics
Communication elective++
Two general electives*

++**Communication electives:**
Must take one of:
COMM 3420U Human-Computer Interaction
COMM 3520U Public Relations
COMM 3530U Advertising and Marketing Communication

YEAR 4 (**30 credit hours**)

COMM 4110U Communication Research in Practice
COMM 4120U Senior Seminar – Professional Practice
COMM 4130U Capstone Project
COMM 4610U Mediation and Conflict Management
COMM 4710U Globalization and International Communication
BIOL 4080U Bioethics (must be taken in fourth year)
General elective*
Communication elective+++
Two Science electives◊◊◊

+++**Communication electives:**
Must take one of:
COMM 4140U Rhetoric
COMM 4510U Strategic Management Communication
COMM 4520U Advanced Business Communication
COMM 4530U Communications Consulting
COMM 4810U Special Topics: Internship

◊◊◊**Science electives:**
Must take two of:
CHEM 1010U Chemistry I
CHEM 1020U Chemistry II (prerequisite: CHEM 1010U)
ENVS 1000U Environmental Science
FSCI 1010U Introduction to Forensic Science
MATH 1000U Introductory Calculus or MATH 1010U Calculus▪
PHY 1010U Physics I (Corequisite: MATH 1010U) or
PHY 1030U Introductory Physics (Corequisite: MATH 1000U Introductory Calculus)▪
SCIE 1900U Astronomy

▪All students who have completed Grade 12 Advanced Functions (MHF4U) and Calculus and Vectors (MCV4U) should take MATH 1010U and PHY 1010U. Students without one of these high school courses or equivalent are directed to take MATH 1000U and PHY 1030U.

15.2.11 Communication minor

A minor in Communication is available to students of other majors at UOIT. This concentration can be combined with other disciplines to prepare a student for a career that involves public relations or strategic management in a specialized field or industry (e.g. engineering). The Communication minor consists of seven courses (35 credit hours), four of which are compulsory core courses.

Core courses
COMM 1100U Introduction to Communication
COMM 1310U Fundamentals of Professional Writing (or equivalent course)
COMM 1610U Interpersonal Communication
COMM 2310U Advanced Professional Writing and Editing

Communication electives
Choose three of the following (one of them must be a 3000- or 4000-level course):
COMM 1320U Oral Communication and Public Speaking
COMM 2210U Communication and Culture
COMM 2510U Business Communication
COMM 3320U Writing for Business and Government
COMM 3330U Scientific and Technical Writing
COMM 3410U Web Design/Multimedia Authoring
COMM 3420U Human-Computer Interaction
COMM 3510U Organizational Communication
COMM 3520U Public Relations
COMM 3530U Advertising and Marketing Communication
COMM 3610U Persuasion, Argumentation and Negotiation
COMM 3710U Intercultural Communication
COMM 4530U Communications Consulting
COMM 4610U Mediation and Conflict Management
COMM 4710U Globalization and International Communication

Note: All available courses for a minor in Communication have been listed. Please refer to course prerequisites for upper-level courses outlined in Section 16.

15.2.12. Program information – Communication Bridge program

15.2.12.1 General information

The Communication Bridge program provides college graduates with the opportunity to apply their three-year Ontario college diploma in Print and Broadcast Journalism, Public Relations or Advertising toward a Bachelor of Arts (Honours) in Communication.

Students enrolled in the Communication Bridge will complete two bridge courses that will position them for entrance directly into third year of the Communication degree program at UOIT.

15.2.12.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Graduates from a three-year Ontario College Advanced diploma program (or equivalent) program in Print and Broadcast Journalism, Public Relations or Advertising, with an overall B average or better, will be considered for admission to UOIT's Bachelor of Arts (Honours) in Communication Bridge program.

15.2.12.3 Bridge completion requirements

The Communication Bridge program consists of the following two courses:

- COMM 1110U Developments in Human Communication; and
- COMM 2110U Foundations of Communication Theory.

Students who successfully complete the bridge courses with a cumulative B average will be eligible for admission to the third year of UOIT's four-year Bachelor of Arts (Honours) in Communication degree program.

Please refer to years three and four in Section 15.2.6 for the relevant program maps and degree requirements.

15.3 Program information – Bachelor of Arts (Honours) in Community Development

15.3.1 General information

The Community Development program educates students for careers in urban, rural, regional, and international development and revitalization. It emphasizes strategies for sustainable development, targeting improved quality of life, community issues and community planning. This interdisciplinary major draws on Faculty strengths in political science, sociology, public policy, geography, philosophy, legal studies and economics to give students a multidisciplinary integrated background that is specifically directed at an appreciation and mastery of community development theory and practice. There are four areas of emphasis embedded in the Community Development program: community development skills, sustainable communities, global development, and urban-rural development. With this integrated preparation, Community Development graduates will be prepared to assume development positions in the private, public and not for profit sectors.

Students learn to build an integrated approach to Community Development, in which they will obtain the skills and knowledge necessary to assume leadership roles within the field. Specifically, students will:

- Explore the key methodological and theoretical principles that lie behind community development;
- Acquire knowledge and skills to practice sensitively and effectively with a range of communities;
- Understand and challenge oppressive practice such as that relating to racism, structural disadvantage and discrimination;
- Foster social change and community regeneration;
- Acquire academic foundations that will allow further study at the postgraduate level.

15.3.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U). All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

15.3.3 Community Development Project

Fieldwork is an exciting opportunity for students within the varied programs in the Faculty of Social Science and Humanities. The Community Development Project is unique to the Community Development program, and is intended to engage students in real world applications of their knowledge and skills in the community.

The Community Development Project is a required component over both semesters of the fourth year of study. Working with a community based organization or business, students will plan and, time allowing, implement a project intended to build local capacity in some concrete way.

15.3.4 Careers

There is a demonstrated need for graduates with the skills necessary to engage in the process of change and growth in local and global communities. Thus, our students will find employment in a wide array of relevant careers, including community organizing, social planning, sustainable development, grant writing, outreach coordination, and community services. The program will also prepare them for graduate studies in related disciplines, or for law school.

15.3.5 Degree requirements

To be eligible for the BA (Hons) degree in Community Development, students must successfully complete 120 credit hours, including all courses outlined in the following program map. Each year prior to course registration the order and timing of course offerings will be released by the faculty and communicated to students. For course descriptions, see Section 16.

YEAR 1 (30 credit hours)

BUSI 1600U Management of the Enterprise
CDEV 1000U What is Community?
COMM 1610U Interpersonal Communication
POSC 1000U Political Science
PSYC 1000U Introductory Psychology
SOCI 1000U Introductory Sociology
SSCI 1200U Introduction to Social Policy
SSCI 1910U Writing for the Social Sciences
SSCI 1300U Social Problems
General elective (recommended: ALSU 1101U Foundations for Academic Learning and Success)

YEAR 2 (30 credit hours)

CDEV 2000U Mobilizing for Change
CDEV 2100U Global Communities
SSCI 2900U Research Methods
SSCI 2910U Quantitative Methods
SSCI 2920U Qualitative and Case Study Research Methods
SSCI 2020U Issues in Diversity
POSC 2000U Canadian Politics
PUBP 3502U Community Development Policy
ENVS 1000U Environmental Science
General elective

YEAR 3 (30 credit hours)

CDEV 3200U Rural-Urban Fringe
CDEV 3201U Rural Communities
CDEV 3203U Urban Development
Two of: CDEV 3100U Political Economy of Global Development or
CDEV 3101U Inequality and Development or
CDEV 3102U Culture and Community
Two of: CDEV 3300U Building Sustainable Communities or
CDEV 3301U Eco-justice or
CDEV 3302U Environment and Globalization
One of: HSCI 4910U Introduction to Community Based Research for Health or
PUBP 4900U Evaluation Research
Two general electives

YEAR 4 (30 credit hours)

CDEV 4500U Community Development Project (6 credit hours/two semesters)
SSCI 4010U Policy Development
SSCI 4020U Leadership and Administration
COMM 4720U Communication for Social Change
LGLS 4200U Law and Social Change
One of: COMM 4610U Mediation and Conflict Management
SSCI 4032U Theory and Practice of Mediation
Three general electives

15.4 Program information – Bachelor of Arts (Honours) in Criminology and Justice

15.4.1 General information

The Faculty of Social Science and Humanities offers a four-year Criminology and Justice program designed to educate students with a broad range of skills required in a variety of fields from criminal justice to law and social services.

Students learn to build an integrated approach to justice services through the examination of each of the justice system's components, including the victim. Graduates will be skilled in taking leadership roles and more collaborative approaches within their own fields and within the related infrastructures of society.

The first year of study is common to all Criminology and Justice students. Beginning in second year, students will have the opportunity to continue with the Comprehensive program or to choose one of four areas of specialization.

15.4.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U). All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

15.4.3 Field work practicum

Fieldwork is an exciting opportunity for students in UOIT's Faculty of Social Science and Humanities. The fieldwork practicum represents a vehicle for experiential learning, as it equips students with a firsthand perspective on the interconnectedness of services required by the community. The fieldwork practicum is offered in the fourth year of study. It is an important learning tool that provides students with opportunities to confront the relationships between theory and practice, acquire workplace knowledge and skills, and to cultivate a sense of personal development.

15.4.4 Careers

Demand is increasing rapidly for people with knowledge and skills gained through studies in Criminology and Justice. Employers, including police services, corrections, customs, immigration, law, human rights, private business, victims' agencies, private security, and government services, have confirmed their need for graduates of this program.

15.4.5 Degree requirements

To be eligible for the BA (Hons) degree in Criminology and Justice, students must successfully complete 120 credit hours, including all courses outlined in the following program map. Each year prior to course registration the order and timing of course offerings will be released by the faculty and communicated to students. For course descriptions, see Section 16.

YEAR 1 (30 credit hours)

SSCI 1300U Social Problems
POSC 1000U Political Science
PSYC 1000U Introductory Psychology
SOCI 1000U Introductory Sociology
SSCI 1000U Introduction to Criminal Justice
SSCI 1010U Introduction to Canadian Legal System
SSCI 1200U Introduction to Social Policy
SSCI 1910U Writing for the Social Sciences
Two general electives

YEAR 2 (30 credit hours)

PSYC 2030U Abnormal Psychology
SSCI 2810U Sociological Theories of Crime
SSCI 2900U Research Methods
SSCI 2910U Quantitative Methods
SSCI 2920U Qualitative and Case Study Research Methods
One of: SSCI 2010U Criminal Law or
SSCI 2011U Immigration and Refugee Law
One of: SSCI 2020U Issues in Diversity or
SSCI 2021U Issues in the Family
One of: SSCI 2030U Social Control or
SSCI 2031U Alternative Methods in Justice or
SSCI 2050U Rights and Freedoms in the Justice System or
SSCI 2830U Justice Theory and Policy
Two general electives

YEAR 3 (credit hours)

One of: SSCI 3910U Advanced Quantitative Methods or
SSCI 3920U Advanced Qualitative Methods
One of: SSCI 3010U Social Justice and Conflict or
SSCI 3028U Women in the Criminal Justice System or
SSCI 3052U Policing Diverse Communities or
SSCI 3056U Race and Ethnicity in the Criminal Justice System
One of: SSCI 3020U Corporate Crime or
SSCI 3021U Cybercrime or
SSCI 3024U Criminal Gangs or
SSCI 3026U Issues in Organized Crime or
SSCI 3045U Terrorism
One of: SSCI 3022U Hate Crime or
SSCI 3023U Domestic Violence or
SSCI 3025U Victimology or
SSCI 3027U Youth, Crime and Violence
Two of: SSCI 3050U Policing or
SSCI 3053U Prosecution and Sentencing or
SSCI 3060U Punishment and Society
Four general electives

YEAR 4 (30 credit hours)

SSCI 4010U Policy Development
SSCI 4020U Leadership and Administration
SSCI 4098U Criminology and Justice Field Work Practicum
One of: SSCI 3040U Restorative Justice or
SSCI 4032U Theory and Practice of Mediation
One of: SSCI 4000U Advanced Justice Studies or
SSCI 4005U Independent Study or
SSCI 4101U Honours Thesis I
One of: SSCI 4099U Criminology and Justice Integrating Project or
SSCI 4102U Honours Thesis II
Four general electives

15.4.6 Program details – Criminal Justice specialization

In the Criminal Justice specialization, students will explore the foundations of historical and contemporary patterns of social control, and then turn to more focused consideration of the three main institutions of formal control: police, courts and corrections.

YEAR 1

Year 1 is the same as the comprehensive Criminology and Justice major.

YEAR 2

Year 2 is the same as the comprehensive Criminology and Justice major with the exception that SSCI 2010U Criminal Law and SSCI 2030U Social Control are required.

YEAR 3 (30 credit hours)

SSCI 3050U Policing
SSCI 3053U Prosecution and Sentencing
SSCI 3060U Punishment and Society
One of: SSCI 3910U Advanced Quantitative Methods or
SSCI 3920U Advanced Qualitative Methods
One of: SSCI 3010U Social Justice and Conflict or
SSCI 3028U Women in the Criminal Justice System or
SSCI 3056U Race and Ethnicity in the Criminal Justice System
One of: SSCI 3020U Corporate Crime or
SSCI 3021U Cybercrime or
SSCI 3024U Criminal Gangs or
SSCI 3026U Issues in Organized Crime or
SSCI 3045U Terrorism
One of: SSCI 3022U Hate Crime or
SSCI 3023U Domestic Violence or
SSCI 3025U Victimology or
SSCI 3027U Youth, Crime and Violence
One of: SSCI 3062U The Prison Experience or
SSCI 4079U Pains of Imprisonment
Two general electives

YEAR 4 (30 credit hours)

SSCI 4010U Policy Development
SSCI 4098U Criminology and Justice Field Work Practicum
One of: SSCI 4000U Advanced Justice Studies or
SSCI 4005U Independent Study or
SSCI 4101U Honours Thesis I
One of: SSCI 3040U Restorative Justice or
SSCI 4032U Theory and Practice of Mediation
One of: SSCI 4099U Criminology and Justice Integrating Project or
SSCI 4102U Honours Thesis II
One of: SSCI 3052U Policing Diverse Communities or
SSCI 4085U Emerging Patterns of Policing
Two of: SSCI 4020U Leadership and Administration or
SSCI 4065U Criminal Justice Ethics and Misconduct or
SSCI 4075U International Perspectives on Criminal Justice
Two general electives

15.4.7 Program details – Gender, Sexualities and Justice specialization

The Gender, Sexualities and Justice specialization is designed for an in-depth exploration of the important under-studied intersection between gender, sexualities and crime. Students will examine topics such as the social construction of sexualities and gender, theoretical explanations for male and female offending and the differential experiences of men, women and members of the lesbian, gay, bisexual and transsexual community within the criminal justice system.

YEAR 1 **(30 credit hours)**

Year 1 is the same as the comprehensive Criminology and Justice major.

YEAR 2 **(30 credit hours)**

PSYC 2030U Abnormal Psychology
SSCI 2020U Issues in Diversity
SSCI 2810U Sociological Theories of Crime
SSCI 2840U Introduction to Gender, Sexualities and Justice Studies
SSCI 2900U Research Methods
SSCI 2910U Quantitative Methods
SSCI 2920U Qualitative and Case Study Research Methods
One of: SSCI 2010U Criminal Law or
SSCI 2011U Immigration and Refugee Law
One of: SSCI 2030U Social Control or
SSCI 2031U Alternative Methods in Justice or
SSCI 2050U Rights and Freedoms in the Justice System or
SSCI 2830U Justice Theory and Policy
General elective

YEAR 3 **(30 credit hours)**

SSCI 3023U Domestic Violence
SSCI 3028U Women in the Criminal Justice System
SSCI 3035U Representations of Crime and Justice
One of: SSCI 3910U Advanced Quantitative Methods or
SSCI 3920U Advanced Qualitative Methods
Two of: SSCI 3050U Policing or
SSCI 3053U Prosecution and Sentencing or
SSCI 3060U Punishment and Society
Two Gender, Sexualities and Justice electives*
Two general electives

YEAR 4 **(30 credit hours)**

SSCI 4010U Policy Development
SSCI 4020U Leadership and Administration
SSCI 4098U Criminology and Justice Field Work Practicum
One of: SSCI 4000U Advanced Justice Studies or
SSCI 4005U Independent Study or
SSCI 4101U Honours Thesis I
One of: SSCI 3040U Restorative Justice or
SSCI 4032U Theory and Practice of Mediation
One of: SSCI 4099U Criminology and Justice Integrating Project or
SSCI 4102U Honours Thesis II
Gender, Sexualities and Justice elective*
Three general electives

***Gender, Sexualities and Justice electives**
LGLS 3130U Family Law
LGLS 3330U Gender, Sexuality and the Law
LGLS 3600U Family and Personal Mediation
SSCI 2021U Issues in the Family
SSCI 3010U Social Justice and Conflict
SSCI 3022U Hate Crime
SSCI 3025U Victimology
SSCI 3027U Youth, Crime and Violence

15.4.8 Program details – Race, Ethnicity and Justice specialization

The Race, Ethnicity and Justice specialization provides historical and sociological perspectives on the intersection of race/ethnicity, crime and criminal justice. Students will discover how practices of criminal justice come to reflect aspects of societal organization, including inequality, conflict and social change.

YEAR 1

Year 1 is the same as the comprehensive Criminology and Justice major.

YEAR 2

PSYC 2030U Abnormal Psychology
SSCI 2020U Issues in Diversity
SSCI 2050U Rights and Freedoms in the Justice System
SSCI 2810U Sociological Theories of Crime
SSCI 2831U Critical Race Theory
SSCI 2900U Research Methods
SSCI 2910U Quantitative Methods
SSCI 2920U Qualitative and Case Study Research Methods
Two general electives

YEAR 3 (30 credit hours)

SSCI 3010U Social Justice and Conflict
SSCI 3052U Policing Diverse Communities
SSCI 3056U Race and Ethnicity in the Criminal Justice System
One of: LGLS 3310U Aboriginal Issues and the Law or
LGLS 3320U Race, Ethnicity and the Law or
LGLS 3620U Human Rights Mediation or
SSCI 3022U Hate Crime or
SSCI 3035U Representations of Crime and Justice
One of: SSCI 3910U Advanced Quantitative Methods or
SSCI 3920U Advanced Qualitative Methods
Two of: SSCI 3050U Policing or
SSCI 3053U Prosecution and Sentencing or
SSCI 3060U Punishment and Society
Three general electives

YEAR 4 (30 credit hours)

SSCI 4010U Policy Development
SSCI 4020U Leadership and Administration
SSCI 4026U Advanced Topics in Race, Ethnicity and Justice
SSCI 4098U Criminology and Justice Field Work Practicum
One of: SSCI 4000U Advanced Justice Studies or
SSCI 4005U Independent Study or
SSCI 4101U Honours Thesis I
One of: SSCI 3040U Restorative Justice or
SSCI 4032U Theory and Practice of Mediation
One of: SSCI 4099U Criminology and Justice Integrating Project or
SSCI 4102U Honours Thesis II
Three general electives

15.4.9 Program details – Youth, Crime and Justice specialization

Within the Youth, Crime and Justice specialization students will look at youthful offending and victimization, as well as systems of youth justice in Canada and elsewhere. Particular emphasis is given to contemporary issues in youth justice and the effectiveness of the justice system in dealing with young people who come into conflict with the law.

YEAR 1

Year 1 is the same as the comprehensive Criminology and Justice major.

YEAR 2

PSYC 2010U Developmental Psychology
PSYC 2030U Abnormal Psychology
SSCI 2021U Issues in the Family
SSCI 2025U Youth Cultures
SSCI 2810U Sociological Theories of Crime
SSCI 2900U Research Methods
SSCI 2910U Quantitative Methods
SSCI 2920U Qualitative and Case Study Research Methods
One of: SSCI 2030U Social Control or
SSCI 2031U Alternative Methods in Justice or
SSCI 2050U Rights and Freedoms in the Justice System or
SSCI 2830U Justice Theory and Policy
General elective

YEAR 3 (30 credit hours)

SSCI 3027U Youth, Crime and Violence
SSCI 3037U Youth Justice Policy
One of: SSCI 3910U Advanced Quantitative Methods or
SSCI 3920U Advanced Qualitative Methods
One of: SSCI 3010U Social Justice and Conflict or
SSCI 3028U Women in the Criminal Justice System or
SSCI 3052U Policing Diverse Communities or
SSCI 3056U Race and Ethnicity in the Criminal Justice System
Two of: SSCI 3050U Policing or
SSCI 3053U Prosecution and Sentencing or
SSCI 3060U Punishment and Society
Youth, Crime and Justice elective*
Three general electives

YEAR 4 (30 credit hours)

SSCI 4010U Policy Development
SSCI 4020U Leadership and Administration
SSCI 4098U Criminology and Justice Field Work Practicum
One of: SSCI 3040U Restorative Justice or
SSCI 4032U Theory and Practice of Mediation
One of: SSCI 4000U Advanced Justice Studies or
SSCI 4005U Independent Study or
SSCI 4101U Honours Thesis I
One of: SSCI 4099U Criminology and Justice Integrating Project or
SSCI 4102U Honours Thesis II
Youth, Crime and Justice elective*
Three general electives

***Youth, Crime and Justice electives**
LGLS 3130U Family Law
LGLS 3600U Family Mediation
SSCI 3024U Criminal Gangs
SSCI 3039U Children, Psychology and the Law
SSCI 4025U Children's Rights

15.4.10 Honours Thesis and Independent Study courses

Honours Thesis I and II – SSCI 4101U and SSCI 4102U
In order to be considered for the Honours Thesis I students must apply during their sixth semester to begin their Honours Thesis I in semester seven. The course application must include a detailed statement of intent outlining the methodology, theoretical significance and the projected timelines for completion of the project. To proceed to Honours Thesis II a student must have successfully completed Honours Thesis I with a minimum A- and prepare a written statement outlining the projected timelines for completion of the project. Please note, only a limited number of applicants will be admitted to the Honours Thesis. Consent is required from both the instructor and the dean.

Independent Study – SSCI 4005U
In order to be considered for the Independent Study students must apply in the semester prior to the commencement of the study. Applications must include a letter of intent detailing the course plan and including a preliminary reading list, a suggested method of evaluation, and suggested timelines for completing the project. Please note, only a limited number of applicants will be admitted to the Independent Study. Consent is required from both the instructor and the dean.

15.5 Program information – Criminology and Justice minor

Minor requirements (18 credit hours)
A minor in Criminology and Justice is available to all students of other majors at UOIT. Students should be aware of course prerequisites needed to pursue this minor. To obtain a minor in Criminology and Justice students must complete the following courses:

PSYC 2030U Abnormal Psychology
SSCI 2010U Sociological Theories of Crime
SSCI 2900U Research Methods
One of: SSCI 3050U Policing
SSCI 3060U Punishment and Society
SSCI 3053U Prosecution and Sentencing
One of: SSCI 3010U Social Justice and Conflict
SSCI 3052U Policing Diverse Communities
SSCI 3028U Women in the Criminal Justice System
SSCI 3056U Race and Ethnicity in the Criminal Justice System
One of: SSCI 3026U Issues in Organized Crime
SSCI 3020U Corporate Crime
SSCI 3021U Cybercrime
SSCI 3022U Hate Crime
SSCI 3024U Criminal Gangs
SSCI 3029U Understanding Recidivist Criminals
SSCI 3045U Terrorism

15.6 Program information – Criminology and Justice Bridge program

15.6.1 General information

The Criminology and Justice Bridge program provides college graduates with the opportunity to apply their Police Foundations, Correctional Worker/Community and Justice Services, Child and Youth Worker, Law and Security Administration diploma, or Youth Corrections and Intervention graduate certificate toward a Bachelor of Arts (Honours) in Criminology and Justice.

Students enrolled in the Criminology and Justice Bridge program will complete four bridge courses that will position them for entrance directly into third year of the Criminology and Justice degree program at UOIT.

15.6.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

To qualify for the Criminology and Justice Bridge program, the minimum entrance requirement is a two-year Ontario College diploma (or equivalent) in Police Foundations, Correctional Worker/Community and Justice Services, Child and Youth Worker (CYW), or Law and Security Administration. Applicants with a Youth Corrections and Intervention (YCI) graduate certificate require a two- or three-year diploma in a related field to be eligible for admission.

15.6.3 Bridge completion requirements

For graduates of Police Foundations, Correctional Worker/Community and Justice Services, Child and Youth Worker (CYW), or Law and Security Administration the Criminology and Justice Bridge program consists of the following four courses:

- SSCI 2810U Sociological Theories of Crime;
- PSYC 2030U Abnormal Psychology;
- SSCI 2900U Research Methods; and
- SSCI 2910U Quantitative Methods.

Students with a graduate certificate in Youth Corrections and Interventions (YCI) and a two- or three-year college diploma in a related field will take the following two bridge courses:

- SSCI 2025U Youth Cultures; and
- SSCI 2910U Quantitative Methods.

After completing the Criminology and Justice Bridge program with a 2.7 cumulative GPA (on a 4.3 scale) or better, with no individual course grade below 2.0 GPA (on a 4.3 scale), students are eligible to enter year three of the Bachelor of Arts (Honours) in Criminology and Justice.

Graduates of CYW and YCI programs who successfully complete the bridge courses will be eligible for admission into the third year of the Bachelor of Arts (Honours) program in the Youth, Crime and Justice specialization.

Please refer to Year 3 and 4 in Section 15.3.5 for the relevant program maps and degree requirements.

15.7 Program information – Bachelor of Arts (Honours) in Forensic Psychology

15.7.1 General information

The Forensic Psychology program at UOIT prepares students for leadership roles in the interface between Psychology and Law. The Forensic Psychology program combines disciplinary study in Psychology, specialized study in Forensic Psychology, study in related fields at UOIT, and applied learning experiences to prepare students to work in a variety of settings and for post-secondary study in fields associated with Forensic Psychology.

The first and second years of study are common to all Forensic Psychology students. In the third and fourth years, students develop unique knowledge bases and skills through carefully selected elective coursework in Forensic Psychology and related disciplines and applied learning experiences.

15.7.2 Field work practicum

See Section 15.3.3.

15.7.3 Careers

The Forensic Psychology program will prepare students for the wide variety of careers that are available to students with bachelors degrees in general Psychology but will particularly emphasize bachelors-level careers in which Psychology intersects with the legal systems. When taken in combination with other courses and concentrations available at UOIT as part of the degree program, Forensic Psychology graduates will be eligible for careers associated with alcohol and drug abuse counseling, case worker, child protection worker, corrections officer, crime prevention officer, family service worker, intelligence officer, law enforcement officer, mediator, mental health technician, private security officer, probation officer, research assistant, residential youth counselor, social services assistant, and statistical assistant. The Forensic Psychology program will also prepare students for graduate-level training in Psychology and Forensic Psychology.

15.7.4 Admissions requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U). All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

15.7.5 Degree requirements

To be eligible for the BA (Hons) degree in Forensic Psychology, students must successful complete 120 credit hours, including all courses outlined in the following program map. Each year prior to course registration the order and timing of course offerings will be released by the faculty and communicated to students. For course descriptions, see Section 16.

YEAR 1 (**30 credit hours**)

POSC 1000U Political Science
PSYC 1000U Introductory Psychology
SOCI 1000U Introductory Sociology
SSCI 1000U Introduction to Criminal Justice
SSCI 1010U Introduction to Canadian Legal System
SSCI 1910U Writing for the Social Sciences
BIOL 1010U Biology 1: Molecular and Cellular Systems
FSCI 1010U Introduction to Forensic Science
Two general electives

YEAR 2 (**30 credit hours**)

SSCI 2900U Research Methods
SSCI 2910U Quantitative Methods
PSYC 2030U Abnormal Psychology
PSYC 2020U Social Psychology
PSYC 2010U Developmental Psychology
PSYC 2060U Cognitive Psychology
PSYC 2050U Brain and Behavior
LGLS 3210U Psychology of Law
Two general electives

YEAR 3 (**30 credit hours**)

SSCI 3910U Advanced Quantitative Methods
Four Forensic Psychology electives *
Three FSSH electives**
Two general electives

YEAR 4 (**30 credit hours**)

One of: PSYC 4101U Forensic Psychology Honours Thesis I (or Forensic Psychology Elective*)
One of: PSYC 4102U Forensic Psychology Honours Thesis II (or Forensic Psychology Elective*)
PSYC 4098U Forensic Psychology Field Work Practicum
Three FSSH electives**
Four general electives

***Forensic Psychology Electives:**
PSYC 2830U Justice Theory and Policy
PSYC 3040U Restorative Justice
PSYC 3310U Confessions and Interrogations
PSYC 3320U Eyewitness Psychology
PSYC 3400U Investigative Psychology
PSYC 3500U Stereotypes and Prejudice
PSYC 3820U Psychology of Deviance
PSYC 3050U Clinical Forensic Psychology
PSYC 3055U Treatment in Forensic Settings
SSCI 3039U Children, Psychology, and the Law
PSYC 2100U Directed Laboratory Research (can repeat with no limit but only one per semester)
Other courses as approved by the Faculty of Social Science and Humanities

****FSSH electives:**
Any course offered by the Faculty of Social Science and Humanities

15.7.6 Forensic Psychology Honours Thesis I and II – PSYC 4101U and PSYC 4102U

In order to be considered for the Forensic Psychology Honours Thesis I students must apply during their sixth semester to begin their Forensic Psychology Honours Thesis I in semester seven. To proceed to Forensic Psychology Honours Thesis II a student must have successfully completed Forensic Psychology Honours Thesis I with a minimum A-. Please note, only a limited number of applicants will be admitted to the Honours Thesis. Instructor and dean’s consent required.

15.7.7 Directed Laboratory Research – PSYC 2100U

In order to be considered for the Directed Laboratory Research students must complete an application form at least one week before the beginning of the semester in which they wish to take the course. The course will involve routine contact and communication between the student and faculty member, during which time the research will be planned, goals established, and progress tracked. The faculty member will provide ongoing guidance and feedback. Depending upon the nature of the research, students may be engaged in collaborative work with other students, graduate students and/or other faculty. Students who successfully complete the course will gain practical research experience. This course will provide students with the opportunity to apply the course concepts and theories from their courses to actual research projects. This course will also provide students with the opportunity to work as part of a research team. Eligibility to enroll in this course includes successful completion of the course prerequisite and a cumulative GPA of 3.5 or higher.

15.8 Program information – Bachelor of Arts (Honours) in Legal Studies

15.8.1 General information

The Legal Studies program at UOIT prepares students for leadership roles in the interface between law and social organization. The Legal Studies program draws on disciplinary strengths in sociology, political science, philosophy, psychology and law to give students an integrated background that is specifically directed at an appreciation and mastery of legal development and administration.

The first year of study is common to all Legal Studies students. Beginning in second year, students will have the opportunity to continue with the Comprehensive program or to specialize in Human Rights Law, Alternative Dispute Resolution or Information Law.

15.8.2 Field work practicum

See Section 15.3.3.

15.8.3 Careers

Legal Studies graduates have a distinct advantage in obtaining and excelling in law-related positions in the private and public sectors. At UOIT, we highlight three particularly high demand areas in our program: alternative dispute resolution, human rights law, and information law. These areas are critical aspects of many processes within modern organizations thus increasing the demand and impact of our graduates. In addition, some students may take the Legal Studies program as a way of preparing themselves for law school. Through our Legal Studies Bridge program we have provided opportunities for students to combine the analytical power of a degree with the practical training of a college diploma.

15.8.4 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U). All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

15.8.5 Degree requirements

To be eligible for the BA (Hons) degree in Legal Studies, students must successfully complete 120 credit hours, including all courses outlined in the following program map. Each year prior to course registration the order and timing of course offerings will be released by the faculty and communicated to students. For course descriptions, see Section 16.

YEAR 1 **(30 credit hours)**

SSCI 1300U Social Problems
POSC 1000U Political Science
PSYC 1000U Introductory Psychology
SOCI 1000U Introductory Sociology
SSCI 1000U Introduction to Criminal Justice
SSCI 1010U Introduction to Canadian Legal System
SSCI 1910U Writing for the Social Sciences
SSCI 1200U Introduction to Social Policy
Two general electives

YEAR 2 **(30 credit hours)**

LGLS 2100U Public Law
LGLS 2200U Legal Theory
LGLS 2940U Legal Research Methods
SSCI 2900U Research Methods
SSCI 3040U Restorative Justice
Two of: LGLS 2120U International Law or
LGLS 2420U Canadian Human Rights Law or
LGLS 2500U Information and Privacy Law
Three general electives†

†**Note:** COMM 1110U Developments in Human Communication is recommended as a second year elective as it is required for all three specializations.

YEAR 3 **(30 credit hours)**

One of: LGLS 3300U Disability and the Law or
LGLS 3310U Aboriginal Issues and the Law or
LGLS 3320U Race, Ethnicity and the Law or
LGLS 3330U Gender, Sexuality and the Law
Three of: LGLS 3200U Sociology of Law or
LGLS 3210U Psychology of Law or
LGLS 3240U Cultural Studies of Law or
LGLS 3230U Law and Globalization or
LGLS 3220U Philosophy of Law or
LGLS 3520U Law and Technology
Four Legal Studies electives*
Two general electives

YEAR 4 **(30 credit hours)**

LGLS 4098U Legal Studies Field Work Practicum
LGLS 4200U Law and Social Change
SSCI 4020U Leadership and Administration
Any 6 credit hours LGLS at the 3000-level
One of: LGLS 4901U Honours Thesis I or
General elective
One of: LGLS 4099U Legal Studies Integrating Project or
LGLS 4902U Honours Thesis II
Three general electives

***Legal Studies electives**
Legal Studies electives consist of any LGLS course plus SSCI 2010U Criminal Law, SSCI 2011U Immigration and Refugee Law, SSCI 4032U Theory and Practice of Mediation and SSCI 2050U Rights and Freedoms in the Justice System.

15.8.6 Program details – Alternative Dispute Resolution specialization

Alternative dispute resolution typically includes arbitration, mediation, early neutral evaluation, and conciliation and sentencing circles. It also offers a less-expensive and faster alternative to settling disputes and disagreements. In this specialization students will learn about the increasing importance placed on alternative ways of solving disputes outside the courtroom.

YEAR 1

Year 1 is the same as the comprehensive Legal Studies major.

YEAR 2

Year 2 is the same as the comprehensive Legal Studies major with the exception that COMM 1110U Developments in Human Communication is a required course.

YEAR 3 (30 credit hours)

COMM 3610U Persuasion, Argumentation and Negotiation
SSCI 4032U Theory and Practice of Mediation
One of: LGLS 3300U Disability and the Law or
LGLS 3310U Aboriginal Issues and the Law or
LGLS 3320U Race, Ethnicity and the Law or
LGLS 3330U Gender, Sexuality and the Law
Two of: LGLS 3200U Sociology of Law or
LGLS 3210U Psychology of Law or
LGLS 3230U Law and Globalization or
LGLS 3240U Cultural Studies of Law or
LGLS 3220U Philosophy of Law or
LGLS 3520U Law and Technology
Two ADR clusters (12 credit hours):
a) LGLS 3410U Labour and Employment Law and
LGLS 3610U Employment and Mediation
b) LGLS 3130U Family Law and
LGLS 3600U Family Mediation
c) LGLS 2420U Canadian Human Rights Law and
LGLS 3620U Human Rights Mediation
General elective

YEAR 4 (30 credit hours)

Year 4 is the same for all Legal Studies students. See Section 15.8.5, Year 4.

15.8.7 Program details – Human Rights Law specialization

One of the major components of Canadian and international law is human rights. This specialization will teach students the complex relationship between the laws, rights and the state, while being exposed to Canadian and human rights discourses and instruments.

YEAR 1

Year 1 is the same as the comprehensive Legal Studies major.

YEAR 2

Year 2 is the same as the comprehensive Legal Studies major with the exception that the following courses are required:

COMM 1110U Developments in Human Communication
LGLS 2120U International Law
LGLS 2420U Canadian Human Rights Law

Note: Students who did not complete these three courses in Year 2 can pick them up in the general elective spaces in Year 3.

YEAR 3 (30 credit hours)

COMM 3710U Intercultural Communication
One of: LGLS 3430U International Human Rights Law or
SSCI 2011U Immigration and Refugee Law or
SSCI 2050U Rights and Freedoms in the Justice System
One of: LGLS 3410U Labour and Employment Law or
LGLS 3100U Administrative Law or
SSCI 2010U Criminal Law
Two of: LGLS 3300U Disability and the Law or
LGLS 3310U Aboriginal Issues and the Law or
LGLS 3320U Race, Ethnicity and the Law or
LGLS 3330U Gender, Sexuality and the Law
Two of: LGLS 3200U Sociology of Law or
LGLS 3210U Psychology of Law or
LGLS 3240U Cultural Studies of Law or
LGLS 3230U Law and Globalization or
LGLS 3220U Philosophy of Law or
LGLS 3520U Law and Technology
Three general electives

YEAR 4 (30 credit hours)

Year 4 is the same for all Legal Studies students. See Section 15.8.5, Year 4.

15.8.8 Program details – Information Law specialization

YEAR 1

Year 1 is the same as the comprehensive Legal Studies major.

YEAR 2

Year 2 is the same as the comprehensive Legal Studies major with the exception that both LGLS 2500U Information and Privacy Law and COMM 1110U Developments in Human Communication are required. Students who did not complete these courses in Year 2 can pick them up in the general elective spaces in Year 3.

YEAR 3 (30 credit hours)

LGLS 3520U Law and Technology
COMM 2410U Communication and Technology or
Two of: LGLS 3510U Censorship and Freedom of Expression or
LGLS 3530U Intellectual Property or
SSCI 3021U Cybercrime
One of: LGLS 3300U Disability and the Law or
LGLS 3310U Aboriginal Issues and the Law or
LGLS 3320U Race, Ethnicity and the Law or
LGLS 3330U Gender, Sexuality and the Law
One of: LGLS 3200U Sociology of Law or
LGLS 3210U Psychology of Law or
LGLS 3230U Law and Globalization or
LGLS 3240U Cultural Studies of Law or
LGLS 3220U Philosophy of Law
Four general electives

YEAR 4 (30 credit hours)

Year 4 is the same for all Legal Studies students. See Section 15.8.5, Year 4.

15.8.9 Honours Thesis and Independent Study courses

Honours Thesis I and II – LGLS 4901U and LGLS 4902U
In order to be considered for the Honours Thesis I students must apply during their sixth semester to begin their Honours Thesis I in semester seven. The course application must include a detailed statement on intent outlining the methodology, theoretical significance and the projected timelines for completion of the project. To proceed to Honours Thesis II a student must have successfully completed Honours Thesis I with a minimum A- and prepare a written statement outlining the projected timelines for completion of the project. Please note, only a limited number of applicants will be admitted to the Honours Thesis. Instructor and dean's consent required.

Independent Study – LGLS 4800U
In order to be considered for the Independent Study students must apply in the semester prior to the commencement of study. Applications must include a letter of intent detailing the course plan and including a preliminary reading list, a suggested method of evaluation, and suggested time lines for completing the project. Please note, only a limited number of applicants will be admitted to the Independent Study. Instructor and dean's consent required.

15.9 Program information – Legal Studies minors

15.9.1 General information

There are four Legal Studies minors available to students outside of the Legal Studies program: Legal Studies, Alternative Dispute Resolution, Human Rights Law, and Information Law. Each minor consists of six courses or 18 credit hours; however, students should be aware of course prerequisites needed to pursue these minors.

15.9.2 Legal Studies minor

Minor requirements
To obtain a minor in Legal Studies students must complete the following courses:

LGLS 2200U Legal Theory
LGLS 2940U Legal Research Methods
One of: LGLS 3200U Sociology of Law or
LGLS 3210U Psychology of Law or
LGLS 3230U Law and Globalization or
LGLS 3240U Cultural Studies of Law or
LGLS 3220U Philosophy of Law or
LGLS 3520U Law and Technology
Three other LGLS courses at the 3000-level

15.9.3 Alternative Dispute Resolution minor

Minor requirements
To obtain a minor in Alternative Dispute Resolution students must complete the following courses:

LGLS 2940U Legal Research Methods
SSCI 4032U Theory and Practice of Mediation
Two ADR clusters (12 credit hours):

a) LGLS 3410U Labour and Employment Law and
LGLS 3610U Employment and Mediation
b) LGLS 3130U Family Law and
LGLS 3600U Family Mediation
c) LGLS 2420U Canadian Human Rights Law and
LGLS 3620U Human Rights Mediation

15.9.4 Human Rights Law minor

Minor requirements
To obtain a minor in Human Rights students must complete the following courses:

LGLS 2120U International Law
LGLS 2420U Canadian Human Rights Law
LGLS 2940U Legal Research Methods
SSCI 2050U Rights and Freedoms in the Justice System
One of: LGLS 3300U Disability and the Law
LGLS 3310U Aboriginal Issues and the Law
LGLS 3320U Race, Ethnicity and the Law
LGLS 3330U Gender, Sexuality and the Law
One of: LGLS 3430U International Human Rights
SSCI 2011U Immigration and Refugee Law

15.9.5 Information Law minor

Minor requirements
To obtain a minor in Information Law students must complete the following courses:

COMM 2410U Communication and Technology
LGLS 2500U Information and Privacy Law
LGLS 2940U Legal Research Methods
LGLS 3520U Law and Technology
Two of: LGLS 3510U Censorship and Freedom of Expression
LGLS 3530U Intellectual Property
SSCI 3021U Cybercrime

15.9.6 Psychology of Law minor

Minor requirements
To obtain a minor in Psychology of Law students must complete the following courses:

One of: FSCI 4010U Forensic Psychology
LGLS 3210U Psychology of Law
Two of: PSYC 2010U Developmental Psychology
PSYC 2020U Social Psychology
PSYC 2030U Abnormal Psychology
PSYC 2040U Personality Psychology
Three of: PSYC 2100U Directed Lab Research
PSYC 2830U Justice Theory and Policy
PSYC 3020U Stereotypes and Prejudice
PSYC 3040U Restorative Justice
PSYC 3310U Confessions and Interrogations
PSYC 3320U Eyewitness Psychology
PSYC 3400U Investigative Psychology
PSYC 3820U Psychology of Deviance
SSCI 3039U Children, Psychology and the Law

15.10 Program information – Legal Studies Bridge program

15.10.1 General information

UOIT's Legal Studies Bridge program provides college graduates with the opportunity to apply their Court and Tribunal Agent/Paralegal or Legal Administration diploma toward a Bachelor of Arts (Honours) in Legal Studies.

Students enrolled in the Legal Studies Bridge program will complete four bridge courses that will position them for entrance directly into third year of the Legal Studies degree program at UOIT.

15.10.2 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

To qualify for the Legal Studies Bridge program, the minimum entrance requirement is a two-year Ontario College diploma (or equivalent) in Court and Tribunal Agent/Paralegal or Legal Administration.

15.10.3 Bridge completion requirements

The Legal Studies Bridge program consists of the following four courses:

- LGLS 2100U Public Law;
- SSCI 2900U Research Methods;
- LGLS 2200U Legal Theory; and
- LGLS 2940U Legal Research Methods.

After completing the Legal Studies Bridge program with a cumulative 2.7 GPA (on a 4.3 scale) or better, with no individual course grade below a 2.0 GPA (on a 4.3 scale), students are eligible to enter year three of the Bachelor of Arts (Honours) in Legal Studies.

Please refer to Year 3 and 4 in Section 15.8.5 for the relevant program maps and degree requirements.

***Legal Studies electives**
Legal Studies Electives consist of any LGLS course plus SSCI 2010U Criminal Law, SSCI 2011U Immigration and Refugee Law, SSCI 4032U Theory and Practice of Mediation and SSCI 2050U Rights and Freedoms in the Justice System.

15.11 Program information – Bachelor of Arts (Honours) in Public Policy

15.11.1 General information

Public Policy is an interdisciplinary undergraduate degree in the applied social sciences that provides a strong preparation for students who are interested in policy and administration in the private and public sectors. The policy program will draw on disciplinary strengths in sociology, political science, geography, philosophy, psychology and economics to give students an integrated perspective that is specifically directed at an appreciation and mastery of policy development and implementation.

The first year of study is common to all Public Policy students. Beginning in second year, students will have the opportunity to continue with the Comprehensive program or to choose one of two areas of specialization; Equity Policy or Technology and Society.

15.11.2 Field work practicum

See Section 15.4.3.

15.11.3 Careers

Modern society has many venues in both the private and public sectors where social policies are defined and implemented. Governments, communities, corporations, and voluntary organizations promote and administer policies on a broad range of issues from social assistance to housing to childcare to working conditions.

15.11.4 Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U). All other applicants should refer to Section 4.5 of this calendar for the requirements for their specific category of admission.

15.11.5 Degree requirements

To be eligible for the BA (Hons) degree in Public Policy, students must successfully complete 120 credit hours, including all courses outlined in the following program map. Each year prior to course registration the order and timing of course offerings will be released by the faculty and communicated to students. For course descriptions, see Section 16.

YEAR 1 (**30 credit hours**)

SSCI 1300U Social Problems
POSC 1000U Political Science
PSYC 1000U Introductory Psychology
SOCI 1000U Introductory Sociology
SSCI 1000U Introduction to Criminal Justice
SSCI 1010U Introduction to Canadian Legal System
SSCI 1200U Introduction to Social Policy
SSCI 1910U Writing for the Social Sciences
General elective

YEAR 2 (**30 credit hours**)

POSC 2000U Canadian Politics
PUBP 2200U Theories of Policy Analysis
PUBP 2800U Economics for Public Policy I
SSCI 2020U Issues in Diversity
SSCI 2050U Rights and Freedoms in the Justice System
SSCI 2900U Research Methods
SSCI 2910U Quantitative Methods
SSCI 2920U Qualitative Research Methods
Two general electives

YEAR 3 (**30 credit hours**)

PUBP 3800U Economics for Public Policy II
SSCI 3010U Social Justice and Conflict
SSCI 3200U Public Administration
One of: SSCI 3910U Advanced Quantitative Methods or
SSCI 3920U Advanced Qualitative Methods
Four Public Policy electives*
Two general electives

YEAR 4 (**30 credit hours**)

POSC 4000U International Politics and Policy
PUBP 4098U Public Policy Fieldwork Practicum
SSCI 4010U Policy Development
SSCI 4020U Leadership and Administration
PUBP 4900U Evaluation Research
One of: Advanced Public Policy elective or
PUBP 4005U Independent Study or
PUBP 4101U Honours Thesis I
One of: PUBP 4005U Independent Study or
PUBP 4099U Public Policy Integrating Project or
PUBP 4102U Honours Thesis II
Advanced Public Policy elective**
Two general electives

15.11.6 Program details – Equity Policy specialization

YEAR 1

Year 1 is the same as the comprehensive Public Policy program.

YEAR 2

Year 2 is the same as the comprehensive Public Policy program.

YEAR 3 (**30 credit hours**)

PUBP 3500U Equity Policy
PUBP 3501U Poverty and Public Policy
PUBP 3502U Community Development Policy
PUBP 3800U Economics for Public Policy II
SSCI 3010U Social Justice and Conflict
SSCI 3200U Public Administration
One of: SSCI 3910U Advanced Quantitative Methods or
SSCI 3920U Advanced Qualitative Methods
One of: LGLS 2420U Canadian Human Rights Law or
LGLS 3300U Disability and the Law or
LGLS 3310U Aboriginal Issues and the Law or
LGLS 3320U Race, Ethnicity and the Law or
LGLS 3330U Gender, Sexuality and the Law
Two general electives

YEAR 4 (**30 credit hours**)

POSC 4000U International Politics and Policy
PUBP 4098U Public Policy Fieldwork Practicum
PUBP 4500U Advanced Equity Policy
SSCI 4010U Policy Development
SSCI 4020U Leadership and Administration
PUBP 4900U Evaluation Research
One of: PUBP 4501U Advanced Poverty and Public Policy or
PUBP 4502U Advanced Community Development Policy or
PUBP 4101U Honours Thesis I or
PUBP 4005U Independent Study
One of: PUBP 4099U Public Policy Integrating Project or
PUBP 4102U Honours Thesis II or
PUBP 4005U Independent Study
Two general electives

15.11.7 Program details – Technology and Society specialization

YEAR 1

Year 1 is the same as the comprehensive Public Policy program.

YEAR 2 (**30 credit hours**)

SSCI 1470U Impact of Science and Technology on Society
POSC 2000U Canadian Politics
PUBP 2200U Theories of Policy Analysis
PUBP 2800U Economics for Public Policy I
SSCI 2900U Research Methods
SSCI 2910U Quantitative Methods
SSCI 2920U Qualitative Research Methods
SSCI 2930U Geographic Information Systems
Two general electives

YEAR 3 (**30 credit hours**)

PUBP 3700U Social Theory and Technology
PUBP 3800U Economics for Public Policy II
SSCI 3200U Public Administration
One of: PUBP 3750U Technology and Popular Culture or
PUBP 3751U Technology and Conflict
One of: SSCI 3910U Advanced Quantitative Methods or
SSCI 3920U Advanced Qualitative Methods
One of: LGLS 2500U Information and Privacy Law or
LGLS 3520U Law and Technology or
SSCI 3021U Cybercrime
Two Public Policy electives*
Two general electives

YEAR 4 (**30 credit hours**)

PUBP 4098U Public Policy Fieldwork Practicum
PUBP 4700U Advanced Topics in Technology and Society
SSCI 4010U Policy Development
SSCI 4020U Leadership and Administration
PUBP 4900U Evaluation Research
One of: Advanced Public Policy elective or
PUBP 4005U Independent Study or
PUBP 4101U Honours Thesis I
One of: PUBP 4005U Independent Study or
PUBP 4099U Public Policy Integrating Project or
PUBP 4102U Honours Thesis II
Advanced Public Policy elective**
Two general electives

***Public Policy electives**
LGLS 2420U Canadian Human Rights Law
PUBP 3500U Equity Policy
PUBP 3501U Poverty and Public Policy
PUBP 3502U Community Development Policy
PUBP 3600U Education Policy
PUBP 3601U Health and Public Policy
PUBP 3602U Workplace and Employment Policy
PUBP 3603U Housing Policy

****Advanced Public Policy electives**
PUBP 4500U Advanced Equity Policy
PUBP 4501U Advanced Poverty and Public Policy
PUBP 4502U Advanced Community Development Policy
PUBP 4600U Advanced Education Policy
PUBP 4601U Advanced Health and Public Policy
PUBP 4602U Advanced Workplace and Employment Policy
PUBP 4603U Advanced Housing Policy

15.11.8 Honours Thesis and Independent Study courses

Honours Thesis I and II – PUBP 4101U and PUBP 4102U
In order to be considered for the Honours Thesis I students must apply during their sixth semester to begin their Honours Thesis I in semester seven. The course application must include a detailed statement on intent outlining the methodology, theoretical significance and the projected timelines for completion of the project. To proceed to Honours Thesis II a student must have successfully completed Honours Thesis I with a minimum A- and prepare a written statement outlining the projected timelines for completion of the project. Please note, only a limited number of applicants will be admitted to the Honours Thesis. Instructor and dean’s consent required.

Independent Study – PUBP 4005U
In order to be considered for the Independent Study students must apply in the semester prior to the commencement of study. Applications must include a letter of intent detailing the course plan and including a preliminary reading list, a suggested method of evaluation, and suggested timelines for completing the project. Please note, only a limited number of applicants will be admitted to the Independent Study. Instructor and dean’s consent required.

SECTION 16:
UNDERGRADUATE COURSE DESCRIPTIONS

Each course description is followed by a list of the credit hours (cr) and contact hours for the course.

Contact hours are divided into lecture (lec), laboratory (lab), tutorial (tut), online (web), and other (oth) hours. A course with a listing of 3 cr, 3 lec, 3 lab, 1 tut, 1 web, 2 oth, is weighted at three credit hours with three hours of lectures, three laboratory hours, one hour of tutorial, one hour of online attendance, and two other contact hours per week.

Courses offered in condensed format will have the number of contact hours prorated accordingly.

Other notations in the course descriptions:

A cross-listed course is a single course that is listed under two or more faculties and identified by different course numbers. The course can be taken for credit from one faculty only. A credit restriction occurs where two or more courses are closely related and credit is limited to one of the courses.

Please note: Not all courses will be offered each year.

ALSU 1101U Foundations for Academic Learning and Success. The purpose of this course is to help students develop learning strategies that build the foundations for academic success. This course is highly participatory, requires self reflection, and encourages the development of critical thinking, goal setting, and self management skills. Topics include learning styles and methods; goal setting; engaging with faculty and campus resources; communication and cooperative learning; time management, academic reading and note taking; test taking, memory and concentration; and creative problem solving. This course will give students the academic foundations needed to succeed in a university environment. 3 cr, 3 lec, 1.5 tut.

BIOL 1010U Biology I: Molecular and Cellular Systems. This course examines the evolutionary basis of life at the cellular level. Topics will include the basic structure and function of cells, cell energetics and respiration, photosynthesis, the structure and function of DNA, the control of gene expression, cell division and the evolution of multicellularity. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisites: Grade 12 Biology (SBI4U) (recommended). Credit restriction: BIOL 1840U. Note: Students without the biology prerequisite will be responsible for making up background material.

BIOL 1020U Biology II: Diversity of Life and Principles of Ecology. This course explores the diversity of fungi, plants and animals. It addresses the evolutionary relationships of these organisms and how each is uniquely adapted to survive and reproduce. The second half of the course introduces the main concepts and principles of ecology and gives a basic understanding of populations and communities. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisite: BIOL 1010U.

BIOL 1840U Biology for Engineers. This course examines the evolutionary basis of life and the structure and function of living organisms. The major tissues, organs, and organ systems and their development from simple structures to more complicated systems will be examined. 3 cr, 3 lec, 1.5 tut. Credit restriction: BIOL 1010U.

BIOL 2010U Introductory Physiology. Overview of the major physiological processes involved in plant and animal growth and development including the mechanism of action of growth regulators and hormones. Emphasis is placed on the use of genetic, biochemical, and physiological approaches to understand the regulation of different systems in plants and animals. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisite: BIOL 1020U.

BIOL 2020U Genetics and Molecular Biology. An introduction to the fields of genetics and molecular biology. Topics include the science of inheritance, DNA structure and replication, meiosis, regulation of gene expression, sex-linked inheritance, analyzing inheritance and heredity, human genetic disorders, and the molecular biology technology on which DNA cloning, and construction of recombinant DNA and of transgenic organisms are based on. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisite: BIOL 1020U. Credit restriction: HLSC 3463U, BIOL 2840U.

BIOL 2030U Cell Biology. Provides a basic knowledge of the structural and functional properties of cells. Emphasizes the mechanisms by which signalling molecules and the process of signal transduction integrate and co-ordinate the functions of many individual cells in a multi-cellular organism. Explores factors regulating the cell cycle and growth. 3 cr, 3 lab (biweekly), 1.5 tut (biweekly). This course is offered in hybrid format, involving 1.5 lec, 1.5 online lectures and self-learning material. Prerequisite: BIOL 1020U. Credit restriction: BIOL 2840U.

BIOL 2050U Human Anatomy. This course is an introduction to the study of body structure with a strong emphasis on human anatomy. Emphasis will be put on the description of bones and joints, muscles, nerves, and blood vessels and lymphatics. The structure of various organs found in the thoracic, abdominal and pelvic cavities will also be described. 3 cr, 3 lec, 3 lab (biweekly). Prerequisite: BIOL 2010U.

BIOL 2060U Introduction to Microbiology and Immunology. An introductory course covering basic concepts in microbiology and immunology. Topics include microbial structure and function, microbial diversity, interaction of microbes with host organisms and the environment, and an introduction to microbial ecology. Material focused on the activity of antimicrobial agents will be integrated throughout the course. An introduction to viruses and to eukaryotic pathogens will be included. Key features of the immune response including cell types and mediators will be introduced in addition to the principles of immunization. 3 cr, 1.5 lec (weekly). This course is offered in a hybrid format with 1.5 hrs face-to-face lectures combined with 1.5 hrs of on-line lectures and self-learning material. Prerequisite: BIOL 2030U. Credit restrictions: BIOL 2830U, BIOL 3030U, MLSC 2130U.

BIOL 2080U Biochemistry I. This course examines the chemical nature of the building blocks found in cells. The topics covered include an overview of organic chemistry principles that relate to biological systems; protein structures and functions; enzymes thermodynamics, kinetics and regulation; lipids structures and functions; role of lipids and proteins in the structure of biological membranes; nucleotides and the structure of nucleic acids; the biochemistry of DNA replication, transcription and translation; carbohydrate structures and functions, and introduction to metabolism. 3 cr, 3 lec, 2 tut. Prerequisites: BIOL 1020U, CHEM 2020U. Credit restrictions: BIOL 1800U, BIOL 2040U.

BIOL 2830U Microbiology for Health Science (formerly BIOL 1820U). Introductory microbiology is a survey study of the comparative biology of microorganisms, directed toward students in health and biological science programs. Common infectious diseases will be examined using a body systems approach. Online tutorial activities will focus on correct aseptic principles, identification of organisms and diagnostic microbiology. Core concepts will be presented and studied in ways that prepare students to apply their understanding in practice in their specific discipline. 3 cr. This course is offered in hybrid format, involving 1.5 lec, 1.5 online lectures and self-learning material, and an online tutorial. Prerequisites: HLSC 1200U, HLSC 1201U. Credit restrictions: BIOL 1820U, BIOL 2060U, BIOL 3030U, MLSC 2130U.

BIOL 2840U Cell and Molecular Biology. This course covers basic properties of cells, cell organelles, differentiated cell systems and tissues. Students will be introduced to scientific literature on the subject of cell biology in order to become familiar with the experimental evidence that supports current knowledge of the cell. They will also learn how to critically examine data and interpretations presented by researchers. 3 cr, 1.5 tut (biweekly). This course is offered in hybrid format, involving 1.5 lec, 1.5 online lectures and self-study material. Prerequisite: BIOL 1020U or BIOL 1840U. Credit restrictions: BIOL 2020U, BIOL 2030U.

BIOL 3010U Laboratory Methods in Molecular Biology. Laboratory-based instruction in the basic methodologies used in the construction of recombinant DNA molecules and construction of transgenic organisms. Students will develop technical skills commonly used in the field of molecular biology, practical knowledge sufficient to perform basic procedures independently, and to analyze experimental results obtained with these techniques. 3 cr, 6 lab. Prerequisites: BIOL 2020U, BIOL 3080U, BIOL 3030U or BIOL 3031U.

BIOL 3020U Principles of Pharmacology and Toxicology. An overview of the action and toxicity of drugs that affect the autonomic nervous system, the central nervous system, and cardiovascular function in both normal and pathological conditions. Toxicological effects of food, food additives, household and industrial products and wastes will also be examined. 3 cr, 3 lec. Prerequisites: BIOL 2010U, BIOL 2080U or BIOL 2040U. Corequisite: BIOL 3080U. Credit restriction: NURS 2810U.

BIOL 3032U Advanced Microbiology. This course explores advanced topics in microbiology, including microbial diversity, bacterial physiology and metabolism, microbial genetics and microbe-host interactions. Applications of microbiology in the food, pharmaceutical, biotechnology and biomedical industries will also be examined. 3 cr, 3 lec, 3 lab. This course will be offered in a hybrid format, involving both face-to-face lectures combined with online lectures and self-learning material. BIOL 3032U is a required course for students in Pharmaceutical Biotechnology. 3 cr, 3 lec, 4 lab. Prerequisites: BIOL 2020U, BIOL 2030U, BIOL 2060U, BIOL 3080U. Credit restrictions: BIOL 1820U, BIOL 2830U, BIOL 3030U.

BIOL 3031U Infection and Immunity. An advanced course building on basic concepts in microbiology and immunology. The focus is on host-pathogen interactions, current concepts in cellular microbiology, host responses, and immunology. Selected bacterial, viral, and parasitic pathogens will be discussed in depth, exploring host evasion, host impact, and host response strategies. Current concepts in immunology will include vaccine development, immunotherapeutics, immunopharmacology, autoimmune disease, transplantation and immunodeficiency, integrating current research issues. 3 cr. The course is offered in hybrid format with 1.5 hrs face-to-face combined with 1.5 hrs online lectures and self-learning material. Prerequisites: BIOL 2030U and one of BIOL 3030U, BIOL 2060U or HLSC 2461U.

BIOL 3040U Physiology of Regulatory Systems. Examines the close relationship between structure and function from the molecular to cellular to organic level and the processes by which regulation of physiological functions occur. Emphasis is placed on the sensing and signalling systems (nervous and endocrine) and then on the effector systems (muscles and glands). 3 cr, 3 lec, 3 lab. Prerequisites: BIOL 2010U, BIOL 2030U, BIOL 3080U or BIOL 2040U.

BIOL 3050U Developmental Biology. Emphasizes principles and key concepts that govern the process of development in vertebrates, with some examples from invertebrate models. Examines how a single fertilized cell gives rise to hundreds of differentiated cells, how differentiated cells are organized into tissues and organs, how the growth of cells is regulated, and how an adult transmits the instructions for making an organism from one generation to the next. 3 cr, 2 lec, 3 lab. Prerequisites: BIOL 2020U, BIOL 2030U.

BIOL 3060U Fundamentals of Neuroscience. Neuroscience is the study of the nervous system and how it operates at the organism level with respect to behaviour, learning and memory. This course provides a broad introduction to neuroscience. The topics covered range from the molecular and cellular mechanisms underlying neural function to an introduction to complex behaviours such as thought and language. 3 cr, 3 lec, 3 lab (biweekly). Prerequisites: PSYC 1000U, BIOL 2050U, BIOL 2040U or BIOL 3080U.

BIOL 3080U Biochemistry II. This course is a continuation of Biochemistry I and will focus on the integration and control of carbohydrate, lipid, and protein metabolism. This course will explore the energy transduction associated with catabolism and synthesis, the structure, synthesis, and metabolism of nucleic acids, and the molecular biochemistry of gene function. 3 cr, 3 lec, 2 tut. Prerequisite: BIOL 2080U. Credit restriction: BIOL 2040U.

BIOL 3610U Comparative Zoology. Provides a general knowledge of the biology of both invertebrates and vertebrates. Various concepts related to form, function, ecology and evolution will be emphasized and compared in the lecture material. Diversity within each phylum will be examined and adaptive explanations will be sought for how these organisms have adapted to the environment. 3 cr, 3 lec. Prerequisite: BIOL 2010U.

BIOL 3620U Conservation Biology. Designed to help students of biodiversity develop practical skills and knowledge that they can use in their professional and personal lives. Integrates local (Ontario), regional (Canada) and global scales of diversity, both of life and of our human responses to these issues. The first unit explores the diversity of species and the genetic basis for their evolution and adaptation. The tools used to measure biodiversity are introduced and the moral and management issues involved in the protection of biodiversity are addressed. 3 cr, 3 lec. Prerequisite: BIOL 2020U.

BIOL 3630U Soil-Plant Relationships. Explores the interrelationships between soil characteristics, root growth, water and nutrient absorption and the mineral nutrition of plants. Topics to be covered include shootroot relations, root growth, soil-plant atmosphere, water relations, soil aeration and plant growth, nutrient transport in the soil-plant system, the root-soil interface, the function of nutrients in plants, nutrient management for sustainable plant production. 3 cr, 3 lec. Prerequisite: BIOL 2010U.

BIOL 3640U Plant Biology. This course is an introduction to plant biology, including an emphasis on the form and function of vascular plants. In addition to functional and anatomical characteristics of vascular plants, plant nutrition, plant-soil interactions, and biotechnological advances will be covered. 3 cr, 3 lec. Prerequisite: BIOL 2030U.

BIOL 3650U Fundamentals of Nutrition. This course provides the basic concepts for the study of human and animal nutrition. Topics will include those related to macronutrient nutrition, fibre and energy metabolism. The structure and function of macronutrients and fibre, their digestion, absorption and metabolism in the body and their implications for health will be discussed. 3 cr. This course is offered in hybrid format, involving 1.5 lec, 1.5 online lectures and online self-learning material. Prerequisite: BIOL 3080U or BIOL 2040U. Credit restriction: HLSC 2820U.

BIOL 3660U Ecology. This course is an introduction to general ecology, including current theories and practices. Fundamentally, ecology is the study of the distribution of organisms and their interactions with the environment. These interactions occur at the level of individuals, populations, communities and ecosystems. As such, the design of the course topic areas will follow this hierarchical structure. 3 cr, 3 lec. Prerequisites: BIOL 2010U, BIOL 2030U.

BIOL 4010U Introduction to Environmental Research Methods. Introduction to methods of developing, evaluating and using evidence in environmental studies. Methods for summarizing and critical appreciation of data describing environmental systems. Skill development in applying statistical techniques and in using microcomputers as a research tool. 3 cr, 3 lec. Prerequisite: STAT 3010U.

BIOL 4020U Environmental Risk Characterization. A biologically-based course that surveys current risk assessment issues in ecotoxicology. Topics include problem definition, effect and exposure characterization, risk assessment and risk management decision making. 3 cr, 3 lec. Prerequisite: BIOL 3020U.

BIOL 4030U Advanced Topics in Environmental Toxicology. Highlights advanced concepts, techniques, research, and industrial applications in the area of environmental toxicology. Selected topics include nutritional toxicology and food safety, toxicology of drugs, contamination of water resources, toxicity and biological fate of pesticides, herbicides, and other environmental contaminants, molecular toxicology, P-450, genetic toxicology, biomedical toxicology, plant pathology, and toxicological epidemiology. 3 cr, 3 lec. Prerequisite: BIOL 3020U. Note: An independent term project will be part of this course.

BIOL 4040U Applied Molecular Biology. A comprehensive study of the molecular biology-based techniques used in biotechnology, basic research, treatment of disease, food production, and forensic science. Applications of these techniques will be illustrated using recently published original research journal articles. 3 cr, 3 lec. Prerequisite: Students must have completed 90 credit hours in their program and have at least one 3000-level BIOL course.

BIOL 4050U Advanced Topics in Pharmaceutical Biotechnology. Highlights the fundamental research and industrial applications of pharmaceutical biotechnology in selected areas including psychopharmacology, cardiovascular pharmacology, neuropharmacology, endocrine pharmacology, quantitative pharmaceutical analysis, drug discovery and design, safety and quality assurance, and protein engineering. 3 cr, 3 lec. Prerequisite: BIOL 3020U.

BIOL 4060U Functional Genomic and Proteomics. An overview of genomics (the study of the structure and function of complete sets of genes of a genome) and proteomics (the study of the structure and function of the complete set of proteins that the genome expresses). The complexity of genes, genome organization, protein structure and methods used for analysis will be discussed from both an historical and current perspective. The practical use of software tools for analysis of genomic and proteomic data will be introduced. 3 cr, 3 lec. Prerequisite: BIOL 4070U.

BIOL 4070U Advanced Biochemistry. A systems oriented course in which biochemical structure, function and metabolism are presented in an integrated fashion. Topics will include protein structure, enzyme regulation, regulation and integration of metabolism, and mechanisms by which a cell's metabolism responds to the environment. 3 cr, 3 lec. Prerequisite: BIOL 3080U or BIOL 2040U.

BIOL 4080U Bioethics. Introduction to bioethical methods and theory to guide discussion of bioethical issues related to the various disciplines in biology including the environment and moral relationships between humans and the rest of the world. Students will discuss bioethical issues from a historical, sociological, and philosophical perspective, with a consideration of how religious beliefs, political ideology, and the law influence positions. 3 cr, 3 lec. Prerequisite: Registration in year four of a Biological Science program or the Science and Technology specialization of the Communication program.

BIOL 4410U Biology Thesis Project I. The thesis project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study and to satisfy specific objectives and requirements. The project will be selected to include research that has been approved by the supervising faculty member. Students will submit a progress report at the end the first semester. Once all work is completed, each student must submit a thesis and make a presentation based on their research in the following semester. 3 cr, 9 oth. Prerequisite: Students will have completed 90 credit hours in their area of specialization and be in clear standing, and must obtain prior consent of a faculty member. Note: Students are expected to take BIOL 4420U in the following semester.

BIOL 4420U Biology Thesis Project II. A continuation of the project started in BIOL 4410U. Students will make presentations based on their research and submit a written thesis. 3 cr, 9 oth. Prerequisite: BIOL 4410U. Note: Students are expected to take this course immediately after BIOL 4410U.

BIOL 4430U Directed Studies in Biology. This course requires independent research of a current topic in a specialized area of biology, including, but not restricted to, ecology, physiology, genetics, microbiology, and molecular biology. The topic will be selected from recent research literature and involve a review and critical appraisal of underlying experimental principles. The course comprises independent library research, participation in weekly meetings, and written and oral presentations. 3 cr, 1 lec, 2 oth. Prerequisite: Students must have completed 90 credits in their Biology program and must be in clear standing. Students must also obtain prior consent of a faculty member.

BIOL 4610U Field Biology. Each year the Ontario Universities' Program in Field Biology offers a diversity of field courses in habitats ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. A complete list of the field courses offered is available at **http://bioserv2.mcmaster.ca/oupfb**. The website includes the course list, the faculty co-ordinator and the host university. Only courses equivalent in weight to 3 credit hours (one half course) at UOIT may be applied to the requirements of the BSc degree. 3 cr. Prerequisites: As specified by host university.

BIOL 4620U Animal Behaviour. This course is designed to provide students with the theoretical background necessary for an understanding of animal behaviour. Students will learn to observe and characterize the behaviours. Key factors such as genetics, developmental and environmental effects will be studied. 3 cr, 3 lec. Prerequisite: BIOL 3610U.

BIOL 4630U Plant Physiology. Provides a greater understanding of the mechanisms and experimental data introduced in the introductory physiology course. Topics include the processes involved in plant growth and development. Emphasizes basic mechanisms of plant development and function, current research in the field, and the use of genetic, biochemical, and physiological approaches to understand the regulation of plant growth. 3 cr, 3 lec. Prerequisites: BIOL 2010U, BIOL 3640U.

BIOL 4730U Advanced Topics in Cell Biology. This seminar course focuses on current topics in cell biology. An emphasis will be on cell signalling processes, signal transduction and cell regulation, cellular responses to their environment, cell to cell interactions, cell cycle regulation, cell death processes, and the regulation and deregulation of these processes in health and disease. 3 cr, 3 lec. Prerequisites: BIOL 2020U, BIOL 3030U, BIOL 2040U or BIOL 3080U.

BUSI 1010U Critical Thinking and Ethics. This course explores the process of thinking critically and guides students in thinking more clearly, insightfully and effectively. Students will develop the abilities to solve problems, analyze issues, and make informed decisions. Some of the development of these skills will occur in a business ethics environment where students will apply their thinking skills to moral dilemmas they may face in their professional and personal lives. The blend of thinking and ethics will provide a rich environment for developing an approach to addressing challenges that face the business world, including (but not limited to) the environment and diversity. 3 cr, 3 web, 1 tut. Credit restrictions: ALSU 1101U, BUSI 2000U.

BUSI 1020U Business Communications. Effective communication is a key to success in business. It is crucial for business people to choose the right words when dealing with colleagues, clients, customers, and others. Students will learn efficient writing techniques to produce summaries, letters, memos, job-search documents, and reports. This will include use of good grammar, style, and consideration of the audience for their communications. Students will also develop their speaking and presentation skills. Other skills in the course will include (but are not limited to) library research and business etiquette. 3 cr, 3 web, 1 tut. Credit restrictions: ALSU 1101U, BUSI 2000U.

BUSI 1101U Financial Accounting. This introductory course examines financial accounting theories, principles, techniques and practices in a Canadian context. Students are introduced to the role of accounting in the business environment, measuring income, valuing assets and liabilities, generally accepted accounting principles, partnership and corporate accounting. 3 cr, 3 lec, 1 tut. Credit restrictions: BUSI 2120U, BUSI 2150U.

BUSI 1450U Statistics. This course introduces the fundamental concepts and applications of descriptive and inferential statistics and probability theory. It also introduces statistical model building. Emphasis is balanced among theoretical concepts, calculations (including computer-based calculations), and data interpretation. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 1915U. Credit restrictions: HLSC 3800U, SSCI 2910U, STAT 2010U, STAT 2020U, STAT 2800U.

BUSI 1500U Business Communications and Computing Skills. This experiential course develops students' proficiency at communicating via interpersonal (one-on-one and small group), electronic and written means and develops computing application skills. Topics include: components of effective business communication (audience, content and delivery); interpersonal skills and the art of effective persuasion; computer literacy and electronic forms of communication; computing applications; the toolbox of effective business writing vocabulary, spelling, grammar, style, punctuation, organization; business writing, planning, researching, reading/thinking, outlining, organizing, writing, rewriting, citing sources, editing, presenting, memos and reports, and special situations job search and interviews. 3 cr, 3 lec.

BUSI 1520U Business Computer Applications. This course will provide skills in Office Suite software – Word, PowerPoint, Excel, Access, and FrontPage, along with VBA macro and SQL. Most emphasis will be placed on developing effective skills in Excel, including the use of Visual Basic (VB) macros, which will allow students to utilize the full power of the spreadsheet software. SQL will provide skills for communication with databases. VB macros and SQL will also provide some exposure to programming. It is intended as a university-level course to develop high-level skills in using these software resources. 3 cr, 2 lec. Note: This course is not available to Information Technology or Computer Science students for credit.

BUSI 1600U Management of the Enterprise. This introductory management course is divided into four parts. Students will be introduced to the core concepts and context of management, enhancing their understanding of how the business environment affects the practice of management. The functions of management will be reviewed, including key topics, issues and problems within the basic management activities of marketing, organizational behaviour/human resources, operations management and information technology, accounting, and finance. The latter components will synthesize the ideas presented in earlier classes by introducing fundamental elements of business strategy, followed by advanced topics in management, including small business, entrepreneurship and e-business. 3 cr, 3 lec.

BUSI 1650U External Environment of Management. This course provides an introduction to the national and international context of Canadian political, economic, legal and business activity. It presents a sampling of the most relevant issues facing managers in business, labour and public sector organizations. Emphasis is placed on developing an understanding of Canada's competitive position today and of the historical background and current influences on this position. Topics covered include an overview of the historical and contemporary socioeconomic events that shape the Canadian and global economies today, the changing world scene, the attractiveness of various world markets, the relative position of Canada vs. the world with respect to labour, capital, and technology, different measures of competitiveness, as well as policy recommendations. 3 cr, 3 lec. Prerequisite: BUSI 1600U.

BUSI 1700U Introduction to Entrepreneurship. Introduces entrepreneurship as a discipline and covers all facets of entrepreneurship, including economics, society, intrapreneuring, and issues, including starting and managing a successful new business venture; new venture capital, creation, and management. 3 cr, 3 lec.

BUSI 1830U Introduction to Programming. This course introduces students to general computer programming principles. Topics include basic computer hardware and software concepts, problem analysis, design of algorithms and programs, the selection of data types, basic I/O, repetition and flow control, decision making, and optionally, principles of object-oriented languages. The course uses a programming language such as Java or C. Applications to business, science and engineering are illustrated. 3 cr, 3 lec. Cross-listed: ENGR 1200U. Credit restriction: INFR 1100U.

BUSI 1900U Mathematical Foundations for Business. This course provides a core mathematical background for students who are undertaking their BCom (Hons). Two main areas of study are linear algebra and calculus. Area of linear algebra covers linear equations, matrix algebra, and linear programming problems using geometric approach and the simplex method. Area of calculus covers the basic characteristics and properties of functions including derivatives and integrals, as well as the accurate methodology to graph functions. In both areas of linear algebra and calculus, practical problems and applications in business are introduced and use of software tools for optimization and graphing is emphasized. 3 cr, 3 lec, 1.5 tut. Credit restrictions: BUSI 1915U, BUSI 1916U, INFR 1015U, INFR 1016U, MATH 1000U, MATH 1010U, MATH 1850U, MATH 2050U.

BUSI 1915U Business Math I. This course provides a mathematical foundation for students in business. This course begins with a review of basic topics, such as exponents, radicals, factoring, fractions, linear and quadratic equations, and inequalities. Following full coverage of lines and slopes, systems of linear equations, and matrix algebra, the course focuses on linear programming problems using geometric approach and the simplex method, including the duality principle. Throughout the course, business applications are introduced and use of software tools, primarily spreadsheets, is emphasized. 3 cr, 3 web, 1 tut. Credit restrictions: BUSI 1900U, INFR 1015U, MATH 1850U, MATH 2050U.

BUSI 1916U Business Math II. The fundamental focus of the course is on elementary calculus, including characteristics properties, classes, and limits of functions, as well as the derivative and rules of differentiation, step-by-step method to graph functions, optimization, and the integral and methods of integration. Throughout the course, a variety of applications in diverse areas of business is presented so the students continually see how the basic mathematics they are learning can be used. Use of software tools for optimization and graphing is also highlighted. 3 cr, 3 web, 1 tut. Prerequisite: BUSI 1450U. Cross-listed: INFR 1016U. Credit restrictions: BUSI 1900U, MATH 1000U, MATH 1010U.

BUSI 2000U Collaborative Leadership. This course intends to develop critical employability skills such as teamwork, leadership, project management, communication skills and intercultural understanding, and will focus students' learning on topics related to interactions with others in personal, educational and professional contexts. Students will engage in collaborative and dynamic learning activities involving direct and practical application of the content/skills critical to professional success. They will explore the practice and impact of leadership, negotiations and teamwork in organizations and communities. These practices will be examined in a variety of settings as described in both popular and academic writings. Learning activities will be directed toward developing leadership for exceptional performance, obtaining commitment to goals and standards, negotiating and resolving conflict, inter-cultural communications, ethical practice, and relating with others in team environments. 3 cr, 3 lec. Credit restrictions: BUSI 1010U, BUSI 1020U.

BUSI 2050U Economics for Professionals. Aspects of theoretical and applied economics relevant to professionals. Fundamental principles in both micro and macroeconomics are introduced. Microeconomics topics include scarcity, opportunity cost, diminishing returns, elasticity, industrial organization, economies of scale and concentration. Macroeconomics topics include unemployment, inflation, economic growth, the multiplier, equilibrium, fiscal policy and monetary policy. The principle of money and banking are introduced along with the role of the Bank of Canada. Applied economics topics covered include cost concepts, time value of money, comparison of alternatives, depreciation, tax considerations, economic analysis of projects, break-even, sensitivity and risk, and decision models. 3 cr, 3 lec. Credit restriction: ECON 2010U.

BUSI 2120U Accounting for IT. Accounting for IT will develop an understanding of how to use, interpret, and understand financial statements and other accounting information. The course will emphasize the role of judgment in accounting and how the managers responsible for preparing accounting information have considerable latitude in deciding how and what information to report. The course uses financial statements and other examples from IT firms to develop an understanding of financial accounting from an IT perspective. 3 cr, 3 lec. Credit restrictions: BUSI 1101U, BUSI 2150U.

BUSI 2150U Financial Accounting I. Financial accounting is concerned with producing information about an economic entity and communicating that information to people who are external to the entity that want or need the information for making decisions. This course is designed to provide an understanding of the accounting process and the choices that exist so that students can be informed and skilled users of accounting information. The course focuses on uses of accounting information for different decisions and from different stakeholder perspectives, and considers the economic and behavioural effects that accounting treatments have on users and preparers. There is an emphasis on interpreting, analyzing, and understanding information. Readings from current publications are used to integrate practical applications of the issues discussed in class. This course is not designed to develop accountants, but it is appropriate for accounting majors. Classroom techniques that develop students' critical skills will be used. 3 cr, 3 lec, 1.5 tut. Credit restrictions: BUSI 1101U, BUSI 2120U.

BUSI 2160U Financial Accounting II. This course is a continuation of BUSI 2150U. It will build on the concepts and skills developed in BUSI 2150U. Readings from current publications are used to integrate practical applications of the issues discussed in class. Case studies, classroom discussions, student presentations and research projects are used to enhance students' critical thinking skills. This course is not designed to develop accountants, but it is appropriate for accounting majors. 3 cr, 2 lec. Prerequisite: BUSI 2150U.

BUSI 2170U Managerial Accounting. This course is an introduction to managerial accounting concepts with a focus on decision making. The course is case oriented and stresses both a manager's and an accountant's perspective on accounting information. Application of techniques is stressed. Students will learn to evaluate techniques based on their implicit assumptions, costs and benefits and appropriateness for specific decisions. Application of concepts and development of critical thinking skills are crucial aspects of this course. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 2160U. Corequisite: BUSI 1101U.

BUSI 2201U Marketing I. This course introduces the basic marketing management methods, principles and concepts. Topics include, market segmentation, marketing mix development and issues, including product, pricing, promotion and channels of distribution, consumer behaviour, social responsibility, and the role of government in marketing. 3 lec, 3 cr. Prerequisites: BUSI 1020U, BUSI 1600U or registration in an "and Management" option with at least year three standing. Credit restriction: BUSI 2205U.

BUSI 2202U Marketing II. This course builds upon the basic concepts and practices of modern marketing introduced in Marketing I. It will focus on managerial decision-making and integration of the decision support function within the marketing information system. 3 lec, 3 cr. Prerequisite: BUSI 2201U.

BUSI 2205U Principles of Marketing. This course is an introduction to marketing for non-BCom (Hons) students. Topics include marketing segmentation, position, distribution, branding and pricing strategies. Not available for credit toward the Bachelor of Commerce degree. 3 cr, 3 lec. Prerequisite: BUSI 1700U. Credit restriction: BUSI 2201U.

BUSI 2311U Organizational Behaviour. This course provides students with a basic understanding of the fundamentals of organizational behaviour. The concepts of individual perceptions and attitudes, group dynamics, motivation, communication, leadership, and power are studied, as well as aspects of the organizational system such as organizational culture and change. Application to human resources management will be highlighted throughout the course. Using interactive techniques and case studies, students will have opportunities to apply organizational behaviour theories, concepts, and practices. 3 cr, 3 lec. Prerequisites: BUSI 1010U, BUSI 1600U or registration in an "and Management" option with at least year three standing.

BUSI 2312U Introduction to Human Resources Management. This course provides students with a basic understanding of the fundamentals of human resources management. The focus of this course is on the management aspect of human resources in order to create an environment that is conducive to maximum productivity. Students will be introduced to effective strategies for attracting, retaining and motivating staff; demographic challenges; human resources planning; performance management; and managing diversity. The impact of technology and human resources information systems will be highlighted throughout the course. Using interactive techniques and case studies, students will have opportunities to apply human resources management theories, concepts, and practices. 3 cr, 3 lec. Prerequisite: BUSI 2311U.

BUSI 2340U Organizational Issues: Problems and Directions. The focus of this course is on the procedures and variables involved in the design and redesign of organizations. Students will be introduced to issues such as departmentalization, differentiation, integration, internal politics, innovation, authority and control, focusing on the underlying technology of the organization. Emphasis will be placed on how one designs both the technical and the organizational systems to ensure their compatibility, noting the effects that one has on the other. Using interactive techniques and case studies, students will have opportunities to apply theories, concepts, and practices. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 2401U Finance I. This course is an introduction to basic concepts in corporate finance. The course develops tools and concepts for understanding of problems facing financial managers. Topics include time value of money, financial ratios, stock and bond evaluations, capital investment decisions and short term finance. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 1101U or BUSI 2150U.

BUSI 2402U Finance II. This course provides an advanced understanding of corporate finance with focus on financial markets. Topics covered in this course include financial securities and financial markets, understanding and measurement of risk and returns, cost of capital, financial leverage of the firm and its dividend policy. The course will also introduce students to international corporate finance and to the practice of mergers and acquisitions. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 2401U.

BUSI 2504U E-Learning. This course introduces the concept of online learning and multimedia technology in the development of interactive multimedia-based learning systems and computer-based training (CBT) courseware. This course covers re-learning development methodologies, including best practices in e-learning design and development, assessment in human factors and introduces CBT/WBT design process, online testing and course management program administration. 3 cr, 3 lec. Prerequisite: INFR 1100U.

BUSI 2505U E-Recruitment and Human Resource Information Systems. The focus of this course is on the procedures and variables involved in the design and implementation of human resources management information systems. Students will be introduced to issues such as planning HR systems, software evaluation, the human aspect of technology, as well as how to create a business case for the implementation of technology. Key trends such as outsourcing, telecommuting, and web-based HR in an international setting will also be examined. Using interactive techniques and case studies, students will have opportunities to apply theories, concepts and practices. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 2550U Introduction to Project Management (formerly INFR 2550U Information Technology Project Management). This course focuses on information technology projects and applies basic project management theory on handling and managing those projects. It introduces the concepts and tools that are appropriate for phases of project life cycle, and incorporates areas outlined in the Project Management Institute's Project Management Body of Knowledge (PMBOK) into the basic concepts associated with information systems management and software engineering. 3 cr, 3 lec. Prerequisite: HLSC 2201U or enrolment in the BIT (Hons) program.

BUSI 2570U Cybercrime (formerly INFR 2570U Cybercrime). This course covers different manifestations of cybercrime, including hacking, viruses and other forms of malicious software. It presents technical and social issues of cybercrime, covers the origins and extent of the cybercrime problem, as well as the commercial and political evolution of the computer hacker. 3 cr, 3 lec.

BUSI 2603U Introduction to Operations Management. This course introduces students to the functional area of production and operations management as practiced in manufacturing industries and the services sector. It includes decision-making, project management, facility layout in both manufacturing and service industries, waiting lines, quality control, just-in-time systems, forecasting, aggregate planning, inventory management, materials requirements planning and operations scheduling. 3 cr, 3 lec. Prerequisite: BUSI 1916U or MATH 1000U or MATH 1010U or MATH 1880U and registration in an "and Management" option with at least year three standing.

BUSI 2604U Introduction to Project Management and Supply Chain Management. This second level course continues to study the functional area of production and operations management as practiced in manufacturing industries and the services sector. It includes decision-making, project management, facility layout in both manufacturing and services industries, waiting lines, quality control, just-in-time systems, forecasting, aggregate planning, inventory management, materials requirements planning and operations scheduling. 3 cr, 3 lec. Prerequisite: BUSI 2603U.

BUSI 2605U Global Logistics and Supply Chain Management. This second course in operations and supply chain management extends the study in the areas of global services and manufacturing organizations. Students will engage in the development of schedules, advanced forecasting techniques, inventory management models, global logistics decisions, network design models, and supply chain management strategic decision making. Through the use of spreadsheets, student will learn how to manage the logistics and supply chain aspects for both manufacturing and service sector firms. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 2603U. Credit restriction: BUSI 2604U.

BUSI 2610U Quality Frameworks. In this theory and lab-based course, students examine the planning tools and techniques used to establish a quality focused system. As well, students look at the effective monitoring and continual improvement in the quality of an organization's products and services. Other topics include quality planning, process capability, gauge capability, Pareto analysis, quality costs, cause and effect, regression correlation, ANOVA, ISO 9000 and acceptance sampling. 3 cr, 3 lec.

BUSI 2620U Business Ethics. This course seeks to answer some fundamental questions, including: Why do organizations need to address ethical issues? What ethical issues arise in the course of business activity? How can individuals and organizations address questions of morality in business? What are the ethical obligations of business people and organizations in society? How do organizations manage for ethical practice and social responsibility? What can individuals do to encourage ethical business practice? The following topics are examined in the course: business ethics and strategic management; stakeholder impact analysis and ethical decision-making; employees as stakeholders; customers and suppliers as stakeholders; the environment and local communities as stakeholders, the legal environment of corporations and the professions; compliance programs; crisis management and global business ethics. 3 cr, 3 lec.

BUSI 2650U Supply Chain and Vendor Management. This introductory course in supply chain management covers the following topics: supply chain activities and functions, the role of purchasing in the supply chain, the purchasing process, purchasing and information technology, sourcing strategies, electronic marketplaces and procurement, negotiating techniques, quality considerations in purchasing, outsourcing and supplier price determination. 3 cr, 3 lec. Prerequisite: BUSI 2604U.

BUSI 2700U Entrepreneurial Finance. This course examines how individual entrepreneurs, companies and capital providers manage the entrepreneurial process and its financial aspects. The course analyzes a wide range of business models and suggests a wide range of solutions to overcome financing and valuation challenges. The course does not only focus on valuation and the analysis of financial challenges that arise over the life cycle of the entrepreneurial venture, but also focuses on the analysis of the people and business models of entrepreneurial ventures. 3 cr, 3 lec. Prerequisite: BUSI 1700U. Credit restriction: BUSI 2401U.

BUSI 2930U Leadership, Negotiation and Teamwork. This course examines the practice and impact of leadership, negotiations and teamwork in organizations and communities. These practices will be examined in a variety of settings as described in both popular and academic writings on the subjects. It is organized around sets of activities critical to managerial success, each involving face-to-face interaction and a high degree of interpersonal skill: developing leadership for exceptional performance; obtaining commitment to goals and standards; negotiating and resolving conflict; cultural awareness; and relating well with one another in team environments. Implications for personal and career development will also be incorporated. Other topics covered include current thinking and research on negotiating, international negotiations and the effect of culture on negotiating styles. 3 cr, 3 lec.

BUSI 3040U Information Systems. This course introduces students to the management issues, concepts and terminology associated with information technology systems. This course is of interest to students with either a technical or a nontechnical background. Issues discussed include: the role of computers in modern organizations; data models and their relation to organization models; systems development processes; and systems theory. Students will learn to recognize opportunities for use of computer based technology at strategic, tactical and operational levels; the technical and organizational problems generated by introducing new technology; and the long-term organizational implications of these decisions. 3 cr, 1.5 lec, 1.5 tut. Prerequisite: Year three standing in BCom (Hons) program, or year three standing in HIM program.

BUSI 3101U Intermediate Financial Accounting I. This course provides an in-depth examination of the accounting concepts, principles, practices, objectives, and techniques underlying asset valuation and income determination. Special emphasis is placed on accounting policy choices and the criteria by which such choices are made. The course makes extensive use of cases to develop an understanding how and why managers make accounting policy choices and the impact of those choices on financial statement users. Critical thinking and problem solving skills are developed. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 2170U.

BUSI 3102U Intermediate Financial Accounting II. This course focuses on the valuation and presentation of liabilities and owners' equity. Topic coverage includes current, long-term and contingent liabilities; leases; pensions; future income taxes; capital transactions; earnings per share, and analysis of financial statements under alternative accounting policies. The perspectives of both preparers and users of accounting information are considered in the coverage of these topics. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 3101U.

BUSI 3110U Introduction to Taxation. The basic concepts and techniques of income taxation and applications to personal tax are examined. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 2170U.

BUSI 3120U Advanced Taxation. The basic concepts and techniques of income taxation and applications to corporate tax are examined. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 3110U.

BUSI 3150U Financial Statement Analysis. The purpose of this course is to develop knowledge and experience in using and interpreting financial statement data to make informed decisions as external financial statement users. In the course a general approach to examining financial statements will be developed and this approach will be applied to four common financial statement uses: evaluating the performance of managers; evaluating risk including the likelihood of financial distress; forecasting financial statement figures; equity valuation using various evaluation techniques and assumptions. 3 cr, 3 lec. Prerequisite: BUSI 2160U.

BUSI 3160U Advanced Managerial Accounting. This advanced level course develops problem solving skills for internal accounting applications. Topics include: cost concepts and analysis; cost accumulation for product costing and variance analysis; cost analysis for decisions involving alternatives; advanced manufacturing technology and accounting concerns are addressed including activity-based costing; target costing; international approaches to cost management; quality costing; benchmarking; life cycle costing; the balanced scorecard and new performance measures; business strategy and competitive positioning; the value chain and competitor analysis; generic strategies and control systems design; management accounting and e-commerce. Cases and problems are used. A research project is required for this course. 3 cr, 3 lec. Prerequisite: BUSI 2170U.

BUSI 3165U Management Control Systems. This course focuses on the theory and practice of the design and administration of management planning and control systems. The point of view emphasized is management and organization theory. Theory and research literature are reviewed. Cases of actual company systems are used. A research project may be required. 3 cr, 3 lec. Prerequisite: BUSI 2170U.

BUSI 3170U Auditing Standards and Applications. This course focuses on the standards, theory and applications underlying the functions and responsibilities of external and internal auditors. The theory of audit evidence and basic techniques are used to provide an understanding of auditing methodology and procedures. The auditor's responsibility beyond the financial audit and current developments in auditing are also examined. Review engagements are also examined. Students are expected to complete and present a research paper or project. 3 cr, 3 lec. Prerequisite: BUSI 2160U.

BUSI 3171U Advanced Auditing. This course extends students' knowledge of auditing by examining the role of the profession in society, evaluating current concerns and issues facing auditors, and building on the understanding of the general audit frame work and its essential theories. This course also examines specific audit topics such as comprehensive auditing, audit of not-for-profit entities, environmental auditing and small business audits. Students generally are expected to complete and present a research paper or project. 3 cr, 3 lec. Prerequisite: BUSI 3170U.

BUSI 3172U Auditing Information Systems. This course is designed to introduce and enhance the students' knowledge about the topic of auditing in computerized environments. The course will focus on issues such as information system concepts, audit and control risks, and implementation and evaluation of security and controls. 3 cr, 3 lec. Prerequisite: BUSI 3170U.

BUSI 3200U Marketing Communications. This course is a study of communication functions in marketing. Students will study the communication methods such as advertising, promotion, personal selling, public relations, and direct marketing in order to achieve a company's marketing objectives. Topics include communication strategies, sales promotion, budgeting, and selection of communication channels. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 3210U Consumer Behaviour. This course focuses on the concepts and theories of consumer behaviour. It examines the impacts of psychological, sociological and other factors on individual and group decision-making processes. Topics include perceptions, values, choices, learning, memory, attitudes, and purchase decisions. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 3220U Sales Management. This course examines the role of sales and sales management as an overall marketing strategy. Topics include recruitment, selection, training, monitoring, motivation, compensation, and supervision of the sales force; forecasting and measurement of sales performance; and the coordination of sales activities with advertising and other activities of the organization. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 3230U Marketing Channels. This course presents a comprehensive overview of the theories and issues within distribution channels. Students will take a closer look at who the different institutions in a channel are (retailers, wholesalers, logistics companies, etc.), how to choose distribution partners (channel planning and design) and how to manage the interactions with these partners (channel management). The course also discusses some special topics in distribution (franchising, international perspectives, e-channels, direct selling and channels for services, etc.). Using interactive techniques and case studies, students will have opportunities to apply theories, concepts, and practices. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 3240U Merchandising Planning and Control. Development of merchandising policies and procedures used in retailing with emphasis on retail mathematics. Specifically, the topics covered include understanding mark-up concepts, planning and controlling margins, planning and controlling reductions, inventory control, developing seasonal budgets, relationship between assortment planning and budgeting, and merchandise open-to-buy controls. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 3250U Service Marketing. This course analyzes the differences between marketing tangible products and marketing services. The focus is on service issues such as customer satisfaction, marketing mix variables, and the importance of service measurement and quality. Specific service industries such as health care and consulting will be studied. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 3260U Marketing Research. This course is concerned with research methods used in marketing. The course focuses on contemporary research techniques and analysis of market-related data. Topics include research design, data collection, data analysis, interpretation, and reporting. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U or permission of instructor.

BUSI 3270U Retail Management. This course is an analysis of the principles involved in retail management. Topics include site selection, merchandise display and design, pricing, promotion, human resources management, stock planning, and inventory control. 3 cr, 3 lec. Prerequisite: BUSI 2170U and BUSI 2202U or BUSI 2205U.

BUSI 3280U Brand Management. This course examines the creation and management of brand equity in modern business enterprises. Special emphasis is placed on the importance of brand equity, brand extensions, brand valuation and global branding. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 3305U Recruiting and Selection. The focus of this course is on the procedures and variables involved in the recruitment and selection of employees. Students will be introduced to issues such as recruiting methods for locating and attracting different types of applicants, identifying and analyzing the effectiveness of the key steps in the selection process, evaluating the reliability and validity of various selection techniques and testing methods. Key trends such as outsourcing, video conferencing, and web-based recruiting and selection tools will also be examined. Using interactive techniques and case studies, students will have opportunities to apply theories, concepts, and practices. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 3312U Industrial and Labour Relations. The focus of this course is on the procedures and variables involved in collective bargaining and union/management relations. Students will be introduced to issues such as union development, the effect of unions on organizational behaviours, the collective bargaining process, the grievance and arbitration process, and other aspects of collective agreement administration. Emphasis will be placed on private sector labour relations. The use of case analysis and role playing will allow students to apply theories from the course and demonstrate the arbitration process. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 3315U Negotiation Theory and Behaviour. The focus of this course is on the procedures and variables involved in the various models of negotiation. Students will be introduced to issues such as the strategies and tactics of negotiation, negotiation ethics, principles of positional, interest based, intra-organizational, and principled bargaining in a variety of organizational contexts. Emphasis will be placed on negotiations as behavioural and decision-making processes. The use of case analysis and role playing will allow students to apply theories from the course and demonstrate the negotiation process. 3 cr, 3 lec. Year three standing in BCom (Hons) program.

BUSI 3319U Conciliation and Dispute Resolution. The focus of this course is on the procedures and variables involved in conflict management and dispute resolution. Students will be introduced to issues such as the cause and consequences of conflict in organizations, and dispute resolution in international commerce. Emphasis will be placed on dispute resolution under NAFTA and WTO. Various theories of negotiation will be introduced at the beginning of the course as an initial starting point of dispute resolution discussion. The use of case analysis will allow students to apply theories from the course and demonstrate the dispute resolution process. 3 cr, 3 lec. Prerequisite: Year three standing in BCom (Hons) program.

BUSI 3330U The Management of Change. As the environment of many organizations (both for profit and non-profit) becomes increasingly complex and unstable, it is crucial that top managers be able to create a climate of adaptability in their organizational practices. Students will examine issues such as the relatedness of internal and external environments, structure, technology, size and function of organizations. Emphasis will be placed on interdependencies of the components of an organization during planned change. The use of case analysis will allow students to apply theories from the course and demonstrate how to overcome obstacles during the change process. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 3340U Human Resource Planning. The focus of this course is on the strategies involved in planning for the human resource needs of an organization. Students will examine issues such as the assessment of current human resource assets, planning for future requirements, personnel selection and rights/equal employment legislation. Emphasis will be placed on recruitment and selection strategies and how they can be used as a competitive advantage for the organization. The use of case analysis will allow students to apply theories from the course and demonstrate a comprehensive human resource planning strategy. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 3350U Developing Management Skills. The focus of this course is on the skills managers need to effectively run an operation within an organization. Students will examine issues such as stress and time management, leadership, motivation, conflict management, and negotiation skills. Emphasis will be placed on the application of the skills in workplace situations. The use of case analysis, presentations, and experiential activities will allow students to apply theories from the course and demonstrate the skills they have acquired. Due to the high amount of time spent on experiential exercises, absenteeism is not permitted. A high percentage of the grade is based on participation in class. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 3360U Health and Safety (formerly Quality of Organizational Life). The focus of this course is on the strategies involved in managing employee health and safety in the turbulent environment of today's modern organizations. Students will examine issues such as the demands of new technology, changing individual lifestyles, changing ethnic and gender composition of the workforce, as well as legal, technical, and management issues regarding employee health and safety. Emphasis will be placed on the impact of new technology on work processes, and innovative workplace health and safety programs. The use of case analysis will allow students to apply theories from the course. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 3370U Employment and Labour Laws. The focus of this course is on federal and provincial labour laws. Students will examine issues such as the practices of federal and provincial relations boards, the practices of the ministries of labour, affirmative action and the common law of employer-employee relationships. The use of case analysis will allow students to apply theories from the course and demonstrate an understanding of the application of labour laws and employee rights. 3 cr, 3 lec. Prerequisite: BUSI 3705U.

BUSI 3380U Compensation and Benefits. The focus of this course is on the strategies involved in planning for the compensation and benefits needs of employees. Students will examine issues such as key legislation, the fit between compensation and organizational strategies, and how to assess benefit needs of an organization. Emphasis will be placed on creating a total compensation and benefit package that can be used as a competitive advantage for the organization. The use of case analysis will allow students to apply theories from the course and demonstrate comprehensive compensation and benefits knowledge and administration practices. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 3390U Training and Development. The focus of this course is on the procedures and variables involved in the design and implementation of training and development programs. Students will be introduced to issues such as how training and development fits within the larger organizational context, as well as the assessment of training needs, the development and implementation of the training program, and the evaluation of the effectiveness of existing training programs. Emphasis will be placed on training methods used in employee orientation, skill training and management development in the context of adult education. The use of case analysis will allow students to apply theories and concepts from the course. 3 cr, 3 lec. Prerequisite: BUSI 2312U.

BUSI 3405U Equity Asset Analysis. Equity assets, primarily stocks and other residual claim investments are analyzed and valued from an investor's perspective. The framework for such an analysis may include valuation models such as dividends, free cash flows, price multiples and residual income. The valuation models are combined with different growth phases such as single, H-model and multi-stage. This is evaluated in conjunction with the business cycle, stock market outlook and industry environment. Students interested in a career in finance or investments, as well as those wanting to manage their own investment portfolios would benefit from studying this course. 3 cr, 3 lec. Prerequisites: BUSI 1450U, BUSI 2402U.

BUSI 3410U Financial Institutions. This is an introductory course on financial institutions. The primary objective of this course is to help students have a better understanding on the key roles of different financial participants, namely the private households, chartered banks, and the central bank. Both theoretical models and real-world examples will be covered to examine the interactions between financial participants which affect the term structures of interest rates, inflation rates, and the economy. 3 cr, 3 lec. Prerequisites: BUSI 2402U, ECON 2020U.

BUSI 3420U Derivative Securities. This course studies the valuation of put and call options, real options, futures and swaps. A number of complex option strategies using derivate securities are analyzed for their ability to speculate or hedge based on capital and money market forecasts. 3 cr, 3 lec. Prerequisites: BUSI 1900U, BUSI 2402U.

BUSI 3430U Personal Finance. The management of the individual's personal finances is the focus of this course. The areas of coverage include planning your personal finances, managing credit, insuring for risks, investments and planning for retirement and the individual's estate. 3 cr, 3 lec.

BUSI 3440U Financial Application Tools. This course studies applications in MS Excel in corporate finance and investments. Using spreadsheets and functions problems are configured and solved in MS Excel on topics such as valuation, measuring risk and return, option valuation, financial statement preparation and analysis. 3 cr, 3 lec. Prerequisites: BUSI 1450U, BUSI 2402U.

BUSI 3450U Business Forecasting Techniques. This course examines the theory and the application of major forecasting techniques and methods used in marketing, economics, operations management, and other functional areas of business. Simple and multiple regression models are studied, followed by time series methods of smoothing, seasonal decomposition, econometrics, and Box-Jenkins ARIMA modelling. After introducing simulation methods and forecasting expert systems, the course addresses important issues of model validation, selection, and control in a business context. 3 cr, 3 lec. Prerequisite: BUSI 1450U or HLSC 3800U or STAT 2010U or STAT 2020U or STAT 2800U.

BUSI 3460U Fixed Income Strategies. Fixed income strategies, from the viewpoint of the investor, for corporate and government bonds, mortgage-backs and other asset-backs are examined. Moreover, the techniques to analyze and manage the return distribution and risks associated with these debt notes are studied. 3 cr, 3 lec. Prerequisites: BUSI 1450U, BUSI 2402U.

BUSI 3480U International Finance. This course focuses on an understanding of the determination of exchange rates in the spot, forward, futures and swap markets. Financing and investment vehicles available to corporations, as well as how firms manage risks and take advantage of opportunities are emphasized. 3 cr, 3 lec. Prerequisites: BUSI 2402U, ECON 2020U.

BUSI 3501U E-Business Technologies. This course introduces the fundamental concepts and applications of e-business technologies from a managerial perspective. Electronic business (e-business) is the use of electronic communication networks (e.g. Internet) to conduct any form of economic activity between trading partners. E-business encompasses an organization's internal operations and business processes. This course covers the topics of impacts of e-business, barriers to e-business, the Internet and the World Wide Web (WWW) for e-business, e-business applications development, information technologies for e-business, privacy and security in e-business, electronic payment systems, and e-business architecture. 3 cr, 3 lec. Prerequisite: BUSI 1830U or INFR 1100U.

BUSI 3502U E-Commerce. This course deals with the development of Internet and its impacts on business transactions. The course explains how electronic commerce affects the way companies, governments, and people conduct business. Topics include the role of the Internet, electronic marketplace, privacy and security issues and electronic payments. 3 cr, 3 lec. Prerequisite: BUSI 1830U or INFR 1100U.

BUSI 3503U E-Marketing. This course analyzes the use of the Internet for marketing. The implications of electronic commerce for product differentiation, pricing, advertising, branding, and distribution of goods and services will be studied. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 3504U Database and Business Intelligence. This course will introduce students to the techniques and tools used to manage databases and conduct basic business intelligence gathering and analysis. Students will be introduced to topics such as normalization, SQL, importance of business intelligence (operational, tactical, and strategic), database security, and developing business intelligence reports. The importance of all forms of business intelligence will be examined as well as a basic introduction to data analysis techniques such as cluster analysis, association detection, and time-series analysis. Using interactive techniques and case studies, students will be able to apply database management and business intelligence theories and practices. 3 cr, 3 lec. Prerequisite: BUSI 1520U or CSCI 1800U or permission of the instructor. Credit restriction: CSCI 3030U or INFR 3810U.

BUSI 3510U Internet Engineering. This course introduces the fundamental concepts and applications of Internet engineering from a technical perspective. The Internet is a loosely-organized international collaboration of autonomous, interconnected networks, supporting host-to-host communication through standardized protocols and procedures. Internet engineering encompasses the Internet architecture and the application layer protocol and language. This course covers the topics of client-server and peer-to-peer architectures, the eXtensible Markup Language (XML) and a portfolio of related standards (e.g. DTD, XPath, XSL, XSLT, and XPointer), services computing such as web services and Grid computing, and IP telephony systems (e.g. VoIP and IP Phone). 3 cr, 3 lec. Prerequisites: BUSI 1830U and BUSI 3040U or INFR 1100U.

BUSI 3520U Applied Internet Multimedia. This course is designed to provide students with an understanding of multimedia technologies and their applications to the development of multimedia products for the Internet. This course will also introduce the tools and procedures required for digital sound recording and editing, analog and digital multimedia presentation (e.g. sound mixers, DAT, videoconferencing equipment), software for developing presentation-based multimedia (e.g. PowerPoint), digital graphics, sound and interactive multimedia, and audio/video streaming technologies. 3 cr, 3 lec. Prerequisites: BUSI 1830U and BUSI 3040U, or INFR 1100U.

BUSI 3530U HTML and Website Design and Management. This course introduces HTML programming and other web design tools. It also covers the basics of installation, configuration, and administration of web servers, including firewalls and proxy servers. Techniques on website management, collection and analysis of web server statistics, website enhancement, and content management will be discussed. 3 cr, 3 lec. Prerequisites: BUSI 1830U and BUSI 3040U, or INFR 1100U..

BUSI 3540U Object Oriented Programming. This course presents the basic concepts of object oriented programming and introduces the principles underlying its practice. It also discusses the analysis, design and implementation of an object oriented system. 3 cr, 3 lec, 3 lab. Prerequisite: BUSI 1830U or INFR 1100U. Cross-listed: INFR 2140U.

BUSI 3550U Systems Analysis and Design. This course is designed to enable students to use the many tools and techniques used in systems analysis and design and examine alternative approaches to systems development. These approaches include structured analysis and design concepts, the prototyping of user interfaces, entity relationship diagrams, data flow diagrams and structure charts. Students will be expected to attain sufficient mastery of these concepts to apply them to a case study. Students will also use a variety of automated computer assisted software engineering (CASE) tools. 3 cr, 3 lec. Prerequisite: BUSI 1830U or INFR 1100U.

BUSI 3570U Server and Network Administration. This course examines the roles of the server-client computing environment from a design and planning perspective. Topics in this course will include learning the design of a functional infrastructure by identifying organizational settings; and selecting and applying various types of servers including messaging, database, multimedia and web services. Issues on system migration, updates, performance statistics, and security will be covered. Evaluation and selection of server hardware and software systems and their optimization will also be discussed. 3 cr, 3 lec. Prerequisites: BUSI 1830U and BUSI 3040U, or INFR 1100U.

BUSI 3580U WWW Networking. An introduction to the Internet networking technology covering internetworking principles and standards such as OSI model, IEEE standards, and protocols. Networking software, internetworking and interoperability of operating systems will be discussed. Implementation and administration of internetworking services and web servers, as well as monitoring, controlling and optimizing networking traffic will be covered. 3 cr, 3 lec. Prerequisites: BUSI 1830U and BUSI 3040U, or INFR 1100U.

BUSI 3600U Inventory Management. This course covers strategic role of inventory management, key strategic drivers of uncertainty in the supply and demand of products, and the tools and techniques for inventory analysis. The course emphasizes inventory control methods with both deterministic and stochastic demand. Other topics included in the course reflect the demands of the manufacturing sector such as machine scheduling, material requirements planning, and multiechelon production and distribution systems. 3 cr, 3 lec. Prerequisites: BUSI 2604U or BUSI 2605U, with a C grade or better.

BUSI 3620U Emergent Technologies in Supplier Management. This course covers the emerging technologies used in supply chain management and discusses the role of technology and technological change in creating challenges and new opportunities for companies working to meet the demands of supply chain relationships. It presents the impact of technology on supply chain operations and the development of products and services. The course examines the current practices and future technological directions in supply chain management and business strategy, and provides innovative new ideas about integrating new technologies into operations, technology-based product and service development, and knowledge management and supply-chain integration issues. 3 cr, 3 lec. Prerequisite: BUSI 2604U or BUSI 2605U, with a C grade or better.

BUSI 3630U Logistics in the Supply Chain. Logistics is the area of the supply chain that deals directly with customers and customer satisfaction. This course covers issues which are critical to supply chain performance as perceived by the customer, including finished goods inventory planning, transportation industry cost and performance structure, and other third party logistics services, especially warehousing, information technology, and integrated logistics services. Order fulfilment process and the role of internal supply chain functions; measurement issues and practices in the supply chain; transportation cost drivers and structure of the transportation industry; other cost drivers within the supply chain (such as warehousing); planning the logistics network using operations research tools; operations issues for logistics with an emphasis on logistics procedures and legalities; third party logistics and outsourcing; logistics decision support systems and current and best practices in logistics. 3 cr, 3 lec. Prerequisite: BUSI 2604U or BUSI 2605U, with a C grade or better.

BUSI 3640U Optimization. This introductory course in optimization covers the following topics: structure and classification of optimization problems, branch and bound algorithms, linear optimization models, linear programming including geometric interpretations, basic solutions, the simplex method, cutting plane algorithms, and network optimization. Students will use various software packages to apply the optimization techniques to inventory and project management problems. 3 cr, 3 lec. Prerequisite: BUSI 1916U with a C grade or better.

BUSI 3650U Innovation Management. This course will introduce students to the techniques and tools used to manage the innovation process for a variety of forms of innovation (including product, services, processes, social and technological). Students will be introduced to topics such as models of innovation, recognizing potential of innovations, supporting organizational change, and commercializing innovations. The importance of leadership, culture and organizational structure on the innovation process will be explored. Using interactive techniques and case studies, students will be able to apply innovation management theories and practices. 3 cr, 3 lec, 1.5 tut. Prerequisite: Year three standing in BCom (Hons) or BIT (Hons) program.

BUSI 3660U E-Business in the Supply Chain. Electronic commerce for Supply Chain Management: process automation systems; operations resources management; purchasing systems; buying on the Internet; EDI; electronic catalogues; electronic auctions; electronic markets; buyer/supplier interfaces; cost/benefit analysis; technical issues; international business issues; legal issues; company case studies. 3 cr, 3 lec. Prerequisite: BUSI 2604U or BUSI 2605U, with a C grade or better.

BUSI 3670U Risk Management Frameworks and Processes. In any organization or process, whether in business, education, health services, or applied sciences or engineering, *risk* is unavoidable – that is, something undesirable and unexpected could occur. Whoever is in charge would be irresponsible to not make every effort to identify and realistically plan for the risks that are faced. This course provides a general framework for managing risks, in whatever field, and introduces time-tested procedures for assessing the risks (i.e. Risk Analysis). Also addressed is the important area of Risk Communication, to colleagues, clients, and when appropriate, the general public. Lecture materials are supplemented by cases, and students are encouraged to bring cases from their own work and academic backgrounds. 3 cr, 3 lec. Prerequisite: Year three standing.

BUSI 3700U Strategic Management for Professionals. This course examines strategy and related concepts. The focus is on strategic management: choosing and defining purposes and objectives, formulating and implementing a viable strategy, and monitoring strategic performance. The thrust of the course is to view the organization in its totality: the external environment in which it operates its strategy, and its internal administrative activities. The emphasis is on assessing the kinds of problems and issues that affect the success of the entire organization. 3 cr, 3 lec.

BUSI 3705U Legal Environment of Business. This introductory business law course covers the following subjects: the Canadian legal system, the US legal system (including class actions, contingency fees, jury trials, punitive damages, cost structures etc.), the legal profession, constitutional law, legal research, contract law (including offer, acceptance, consideration, legality, capacity, misrepresentation, breach, remedy etc.), business associations (sole proprietorships, partnerships and corporations), corporation law, officer and director liability, commercial transactions, civil litigation, alternative dispute resolution, employment law, negligence, professional liability, tort law, real estate law, consumer protection, competition law, marketing law, environmental law, intellectual property law, Internet law, comparative laws and damages and remedies. 3 cr, 3 lec. Prerequisite: Year three standing in BCom (Hons) program.

BUSI 3750U Advanced Entrepreneurship. This course covers the process of starting and scaling an enterprise from an idea and business plan into a company. The focus of the course will be on execution: turning a business plan into a high-growth company. 3 cr, 3 lec. Prerequisite: BUSI 2700U.

BUSI 3800U International Business. This course examines the unique opportunities and problems facing companies in the global business environment. Major economic, social, political, legal, and cultural factors affecting international business will be examined. 3 cr, 3 lec. Prerequisite: Year three standing in BCom (Hons) program.

BUSI 3810U International Management. This course examines the international dimensions of business management in foreign countries. Emphasis is placed on the managerial implications of conducting business in the global business environment. The course provides a framework for analyzing managerial issues and problems faced by management as a result of economic, cultural, political, and social differences in the global environment. 3 cr, 3 lec. Prerequisite: Year three standing in BCom (Hons) program.

BUSI 3820U International Human Resource Management. The focus of this course is on the strategies involved in managing the human resource needs of an international organization. Students will examine issues such as the effect of cultural differences, the strategic use of technology, managing personnel transitions, and organizational design for global competition. Emphasis will be placed on international human resource strategies and how they can be used as a competitive advantage for the organization. The use of discussion and case analysis will allow students to apply theories from the course. 3 cr, 3 lec. Prerequisites: BUSI 2312U, BUSI 3800U.

BUSI 4101U Advanced Financial Accounting. This course examines complex accounting topics including intercorporate investments and international activities. The application of accounting principles to case situations in specialized industries and non-profit organizations is also covered. 3 cr, 3 lec, 1.5 tut. Prerequisite: BUSI 3102U.

BUSI 4140U Contemporary Issues in Accounting. This course concentrates on the application of accounting theory to current and controversial issues in accounting. The topics covered vary with the changing contemporary environment. Students will read from the current accounting literature to gain depth in their appreciation of accounting. The course will include independent research, presentations, and class discussion. 3 cr, 3 lec. Prerequisite: BUSI 4101U.

BUSI 4190U Special Topics in Accounting. This course is an exploration of contemporary issues and topics in accounting. Specific topics and any additional prerequisites will be announced with the schedule each time this course is offered. This course may be retaken with a change in topic to a maximum of 9 credits. 3 cr. Prerequisites: BUSI 3102U, BUSI 3110U, BUSI 3160U.

BUSI 4199U Directed Independent Studies in Accounting. This is a project-based course as supervised by one or more faculty members on an approved topic related to current trends and issues in accounting. 3 cr. Prerequisites: BUSI 2170U and permission of instructor.

BUSI 4203U Advertising Management. This course focuses on the management of a firm's advertising strategy. Topics include advertising decisions, the advertising campaign, segmentation and positioning, message content, budget allocation, media planning, and the social responsibility of advertising. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 4210U High-Tech Marketing. This course is designed to provide an advanced understanding of the strategies and practices involved in marketing technology-based products. These include understanding the unique context of the high-tech industry, the rapid process of innovations, and the specific strategies to build competitive advantage. Specific topics covered include marketing research in high-tech firms, understanding high-tech consumers, product development and management issues, distribution channels, pricing considerations, and advertising/promotions in high-tech markets. The objective of the course is to provide a set of tools and frameworks to be more effective in marketing high-technology products. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 4220U Marketing Strategy. This course focuses on strategic planning and evaluation of marketing decisions in a competitive environment. The purpose of the course is to help students develop analytical abilities by integrating all major areas of marketing. Special emphasis is placed on problem-solving and decision-making in the formulation of marketing strategies. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 4230U Quantitative Marketing Analysis. In this course students will be introduced to analytical, quantitative, and computer modelling techniques that will help in making informed marketing decisions. In particular, students will learn how to analyze marketing data in order to choose the appropriate actions for market segmentation and target market selection; new product and service development; product positioning; and allocation of marketing mix expenditures. Students will use techniques such as factor analysis, conjoint analysis, cluster analysis, choice models, and marketing mix response models. This course is valuable to students planning careers in marketing and management consulting. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 4250U International Marketing. This course examines issues in marketing in the international environment. It focuses on economic, political, legal, and cultural factors in international marketing with special emphasis on the formulation of marketing strategies in foreign countries. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 4270U Business to Business Marketing. This course analyzes problems and processes in marketing to businesses, governments, and non-profit organizations rather than final consumers. It focuses on the managerial aspects of industrial marketing and the adjustments required for the formulation of marketing strategies. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 4290U Special Topics in Marketing. Selected topics of current interest in marketing. 3 cr, 3 lec. Prerequisite: BUSI 2202U or BUSI 2205U.

BUSI 4299U Directed Independent Studies in Marketing. Independent study in selected marketing topics under the supervision of a faculty member. 3 cr, 3 lec. Prerequisites: BUSI 2202U or BUSI 2205U and permission of instructor.

BUSI 4390U Special Topics in Organizational Behaviour and Human Resources Management. A seminar course in advanced organizational behaviour and human resource topics. The focus of this course is to study current trends and studies in specific areas of organizational behaviour and human resource management. Course content may vary from offering to offering but may include such topics as performance management, organizational behaviour and human resources research methodology, or strategic human resource policy. 3 cr, 3 lec. Prerequisites: BUSI 2312U and one 3000-level human resources related course.

BUSI 4399U Directed Independent Study in Organizational Behaviour and Human Resources Management. Directed study and research under the supervision of a faculty member in an area in which the student has shown particular competence and interest. The focus of this course is to study current trends and studies in specific areas of organizational behaviour and human resource management. This course is normally reserved for students intending to continue their studies and pursue advanced education degrees. 3 cr, 3 lec. Prerequisites: BUSI 2312U and one 3000-level human resources related course, and permission of instructor.

BUSI 4405U Portfolio and Investment Strategies. This course studies the techniques to manage investment portfolios from the perspective of mutual funds and other financial institutions such as insurance companies and trust funds. Investment strategies for fixed income securities, equities, real estate and commodities are evaluated. 3 cr, 3 lec. Prerequisite: BUSI 3405U.

BUSI 4410U Advanced Corporate Finance Applications. This course applies advanced corporate finance topics such as capital budgeting, dividend policy, raising financing, capital structure changes, working capital management, and mergers and acquisitions valuation. Business decision making is simulated in the case study method. 3 cr, 3 lec. Prerequisite: Year four standing in BCom (Hons) program.

BUSI 4420U Working Capital Management. Working capital management is the financial management of the short-term assets and liabilities of the corporation. Methods to manage the cash, marketable securities, accounts receivable, inventory, payables and short term debt-financing of the firm are studied. 3 cr, 3 lec. Prerequisites: BUSI 1450U, BUSI 2402U.

BUSI 4430U Mergers and Acquisitions. This course studies the mergers and acquisitions process of corporations. The choice of targets, valuation and financing of the deal, as well as bidding tactics is examined. 3 cr, 3 lec. Prerequisites: BUSI 1450U, BUSI 2402U.

BUSI 4490U Special Topics in Finance. This course will be composed of selected topics of current interest in finance. 3 cr, 3 lec. Prerequisites: BUSI 2402U and permission of instructor.

BUSI 4499U Directed Independent Studies in Finance. This course is an independent study in selected finance topics supervised by a finance faculty member. This course is normally intended for students who plan to pursue graduate study. 3 cr, 3 lec. Prerequisites: BUSI 2402U and permission of instructor.

BUSI 4590U Special Project in E-Business and E-Commerce. This course is an exploration of current issues and topics in e-business and e-commerce. Specific topics and any additional prerequisites will be announced in the schedule each time this course is offered. This course may be retaken with a change in topic to a maximum of 9 credits. 3 cr, 3 lab. Prerequisite: 9 credits in e-commerce related courses.

BUSI 4599U Directed Independent Studies in E-Business and E-Commerce. This is a project-based course as supervised by one or more faculty members on an approved topic related to current trends and issues in e-business and e-commerce. 3 cr. Prerequisites: BUSI 3501U, BUSI 3502U, one 3000-level e-commerce related course and permission of instructor.

BUSI 4610U Business Simulation Modeling. This course introduces business modeling, decision analysis techniques to students using advanced spreadsheets and other forms of simulation modeling. The topics include Monte Carlo simulation, linear and non-linear optimization, sensitivity analysis and regression. Students will be introduced to specialized simulation software to model business processes. Business applications will be drawn from operations and supply chain management, logistics, finance, and marketing.

Using interactive techniques and case studies, students will be able to apply business simulation techniques to theory and practice. 3 cr, 3 lec. Prerequisites: BUSI 2605U or permission of the instructor. Credit restriction: CSCI 3010U.

BUSI 4630U Advanced Logistical Topics in the Supply Chain. As an outcome of the increasing trend towards globalization, logistics is increasingly seen as the critical source of competitive advantage for organizations. Additionally, the Internet offers an alternative route to market and, hence, organizations need to understand its role and how to execute in an online environment. This course moves beyond the basic issues and challenges of logistics to cover more advanced issues which are critical to supply chain performance as perceived by the customer. The issues include: order fulfilment in the last mile, collaboration, technology applications, e.g. RFID, outsourcing, and advanced planning and optimization. Collaboration in the supply chain; business to business processes: outsourcing – current and future issues; virtual enterprises; global supply chain design; international issues in logistics order fulfilment in the last mile of the supply chain; advanced planning in the supply chain logistics: new information technology applications; advanced transportation. 3 cr, 3 lec. Prerequisite: BUSI 3630U.

BUSI 4650U Advanced Supply Chain Management. This course covers strategic role of the supply chain, key strategic drivers of supply chain performance, and the tools and techniques for supply chain analysis. The course presents ways that managers can use in practice for the forefront of supply chain management and information technology in the supply chain. Distribution networks, sourcing and different sourcing activities including supplier assessment, supplier contracts, design collaboration, and procurement; price and revenue management will be discussed. 3 cr, 3 lec. Prerequisite: BUSI 2604U.

BUSI 4652U Supplier Management for Competitive Advantage. The selection, development, and execution of appropriate buyer supplier relationships is the theme of this course. Special emphasis is placed on negotiation, alliance development, and contracting issues in conjunction with ethics and cross-cultural issues. Topics discussed are: sourcing strategies as they relate to market, industry, and supplier dynamics; contract issues and philosophies including execution of competitive bidding (RFQ, RFP, RFI, and SOW); execution of complex alliances and developmental relationships; components of a negotiation plan; use of cost and price data in the negotiation plan negotiation execution; cross-cultural issues in negotiation planning and execution. 3 cr, 3 lec. Prerequisite: BUSI 2604U or BUSI 2605U, with a C grade or better.

BUSI 4680U Applied Project Management: Tools and Applications. Application of supply chain management methods to a business problem or opportunity. Students work in teams and apply project selection and planning methods to plan a new SCM process, quality improvement, or process re-engineering. This work includes written and oral presentations to business sponsors and use of simulation tools, spreadsheets and project planning software. Topics discussed are: developing alternatives; specifying performance metrics; trade-off analysis; sensitivity analysis; process mapping; data collection, including interviewing; specifying a project work breakdown structure; developing an implementation schedule; resource assignment and levelling, risk analysis and management, simulation software, modelling/verification/analysis of simulation studies; spreadsheet analysis and project planning software; presentation methods. 3 cr, 3 lec. Prerequisite: BUSI 2604U or BUSI 2605U, with a C grade or better.

BUSI 4690U Special Topics in Supplier Management. This is a last year, final term course that is expected to address the latest trends and developments of emerging technologies and strategies in the field of supplier and supply chain management. Course content may include advanced simulation modelling, strategic decision making, advanced optimization, network flow theory, or strategic vendor management. 3 cr, 3 lec. Prerequisites: BUSI 2604U or BUSI 2605U, with a C grade or better, and two 3000-level or 4000-level supplier management courses.

BUSI 4699U Directed Independent Studies in Supplier Management. A student or a group of students work on real or fictitious cases from industry and research to solve a supply chain problem. The project comprises a research component, a case/situation analysis, proposal of a solution. Results are presented through a written report and presentations. It is expected that students make use of the IT tools that they were introduced to in other courses of the specialization. 3 cr, 3 lec. Prerequisites: BUSI 2604U or BUSI 2605U, with a C grade or better, and two 3000-level or 4000-level supplier management courses and permission from the instructor.

BUSI 4701U Strategic Management. This course examines strategy and related concepts. The focus throughout is on strategic management: choosing and defining purposes and objectives, formulating and implementing a viable strategy, and monitoring strategic performance. The thrust of the course is to view the organization in its totality: the external environment in which it operates its strategy, and its internal administrative activities. The emphasis is on assessing the kinds of problems and issues that affect the success of the entire organization. Topics include the strategic process, the role of the general manager, the external environment, internal analysis, competitive advantage, strategy and structure, diversification, integrations and alliances, organizational structure, strategy and control, and an introduction to corporate strategy. 3 cr, 3 lec. Prerequisite: Year four standing in BCom (Hons) program.

BUSI 4702U Advanced Strategic Management. This second level course continues to examine strategy and related concepts. The focus throughout is on strategic management: choosing and defining purposes and objectives, formulating and implementing a viable strategy, and monitoring strategic performance. The thrust of the course is to view the organization in its totality: the external environment in which it operates its strategy, and its internal administrative activities. The emphasis is on assessing the kinds of problems and issues that affect the success of the entire organization. Topics include the strategic process, the role of the general manager, the external environment, internal analysis, competitive advantage, strategy and structure, diversification, integrations and alliances, organizational structure, strategy and control and an introduction to corporate strategy. 3 cr, 3 lec. Prerequisite: BUSI 4701U.

BUSI 4991U UOIT Edge I – Capstone Study Project. Directed by three faculty advisors (of whom one is the chair for a group's project), and with input from the employer, this is a six month study of an actual organization by groups of six to eight BCom students. The two capstone courses require the comprehensive description and evaluation of an organization and appropriate recommendations for improved performance with the solution of a particular problem or group of problems. The main purpose of this capstone study is to provide students with opportunities to develop a thorough understanding of the technology, environment, markets, and operations of a real organization by applying the theory and knowledge that they have learned. 3 cr, 3 lec. Prerequisites: Year four standing in BCom (Hons) program and concurrent enrolment in BUSI 4701U or year four standing in BIT (Hons) program.

BUSI 4992U UOIT Edge II – Capstone Study Project. This is a continuation of UOIT Edge I, begun in the previous semester. Student teams continue to study an actual organization. Students will complete a comprehensive analysis and evaluation of an organization and develop appropriate recommendations for improved performance with the solution of a particular problem or group of problems. They will make a formal presentation of their findings and recommendations to faculty advisors and to the management team of the organization. 3 cr, 3 lec. Prerequisite: BUSI 4991U.

BUSI 4995U UOIT Edge – Capstone Study Project. Students will work in teams with an outside client organization, completing a comprehensive analysis and evaluation of the organization and developing appropriate recommendations for improved performance and problem resolution. The student team will make a formal presentation of their findings and recommendations to faculty advisors and to the management of the client organization. Through Capstone, students will develop a thorough understanding of the technology, environment, markets, and operations of a real organization by applying the theory and knowledge that they have learned. 3 cr, 3 lec. Prerequisites: Year four standing in BCom (Hons) program or year four standing in BIT (Hons) program.

CDEV 1000U What is Community? Students taking this course will learn about the controversies surrounding contested ideas/concepts of what a "community" is. Students will learn about some of the principles necessary for fostering a more inclusive model of "community". Students will be introduced to non-traditional forms of "community" including resistance movements, north and south, and global cyber communities. In this course students will be introduced to the different paradigms of community development theory. 3 cr, 3 lec.

CDEV 2000U Mobilizing for Change. Students taking this course will learn about the major controversies and issues in the study of social movements and contentious politics. Different types of social movements will be explored as well as their origin, emergence and organization within the context of community/collective action. Emphasis will be placed on community leadership and the ability to prepare and aid in future social movements (online/conventional). The course content will give examples to students on how to best translate theory and policy into sustainable practice. 3 cr, 3 lec. Prerequisite: CDEV 1000U, SOCI 1000U.

CDEV 2100U Global Communities. Students taking this course will learn about the emergence of global communities over the last century. Students will also learn to identify and assess the needs of global communities. Course content will emphasize community development best practices and policies that extend beyond traditional boundaries of 'community' towards more international development initiatives. 3 cr, 3 lec. Prerequisite: CDEV 1000U.

CDEV 3100U Political Economy of Global Development. Students taking this course will learn to analyze the social, economic, political and facets that underlie the dynamics and policies of international development. Furthermore, students will gain an in depth knowledge of the history of international monetary and trade relations that encompass contemporary efforts to advance developing countries and cities. Special attention in the course content will be paid to changes in both political and corporate ideology, as well as financial regulations and monetary relations over the last forty years. 3 cr, 3 lec. Prerequisite: PUBP 3502U.

CDEV 3101U Inequality and Development. Students taking this course will learn to analyze community development through the lens of difference. In this course, students will learn perspectives of development that take into account the lives and achievements of diverse peoples. The course content seeks to highlight both the inequitable (and unequal) distribution of power and control over development as well as the inequitable distribution over who is entitled to, and who receives developmental assistance. The role of oppressive political practices such as colonization and globalization will be featured. 3 cr, 3 lec. Prerequisite: PUBP 3502U.

CDEV 3102U Culture and Community. This course is designed to provide students with an appreciation of the significant role of local culture in framing and understanding the success/failure of the community development process. It will also frame community as an interactional field for addressing local problems. Students will explore the roles and impacts of various local culture aspects and interactional fields (such as competing land interests, demographic transformations, economic change, technology, local institutional context, tolerance, talent or creativity, norms of reciprocity and trustworthiness) on community building, development and progress. 3 cr, 3 lec. Prerequisite: CDEV 1000U.

CDEV 3200U Rural-Urban Fringe. This course will introduce students to the issues faced at the boundaries of the rural and the urban. It will explore tensions and transitions in land use patterns, as well as lifestyles and politics. 3 cr, 3 lec. Prerequisite: PUBP 3502U.

CDEV 3201U Rural Communities. Students taking this course will acquire the theory, skills, and knowledge necessary to better appreciate the challenges and opportunities facing people in rural settings. Students will analyze different rural issues and learn best practices for empowering local grass roots initiatives. Furthermore, students will learn best practices for helping create new initiatives that are attuned to the precarious economic and political position of many rural communities. 3 cr, 3 lec. Prerequisite: PUBP 3502U.

CDEV 3203U Urban Development. Students taking this course will learn to analyze different urban issues and learn best practices for empowering local grass roots initiatives in urban centres. Furthermore, students will learn best practices for helping create and foster new initiatives for urban development. The course content provides insight into different debates and controversies surrounding urban gentrification projects. 3 cr, 3 lec. Prerequisite: PUBP 3502U.

CDEV 3300U Building Sustainable Communities. This course will provide students with an in-depth analysis of the strengths and weaknesses associated with building sustainable communities. In this course, sustainable development is introduced as a framework designed to meet current social and economic needs while ensuring adequate resources are available for future generations. An emphasis is placed on the components necessary for creating and fostering local economic development strategies that are sustainable. The course content will offer robust theoretical and practical rationales for alternative approaches to community development as well as asset measurement and management. 3 cr, 3 lec. Prerequisite: PUBP 3502U.

CDEV 3301U Eco-Justice. Students taking this course will learn about the history and progression of the environmental justice movement. The course content will challenge students to critically analyze the (dis) placement of marginalized communities in toxic and uninhabitable areas, as well as community resistance to environmental degradation. Emphasis will be placed on identifying the best practices and policies necessary for resolving environmental injustices. 3 cr, 3 lec. Prerequisite: PUBP 3502U.

CDEV 3302U Environment and Globalization. Students taking this course will learn about the effects of globalization on the environment. Specifically, this course is designed to highlight the effects of transnational corporations, and mass migration on differing ecosystems. The course content provides students with a chance to learn differing perspectives and perspectives on the relationship between globalization and the health of the planet. 3 cr, 3 lec. Prerequisite: PUBP 3502U.

CDEV 4500U Community Development Project. This course allows students to apply their knowledge and skills to a concrete development project in the community of their choice, in concert with the agency of their choice. The two semester long project will plan, and time allowing, implement an initiative intended to somehow enhance the capacity of the community in question. 6 cr. Prerequisite: Fourth-year standing in the Community Development program.

CHEM 1010U Chemistry I. The concepts of chemistry including simple reactions and stoichiometry; acids, bases, salts; titration; gases; atomic and molecular structure and chemical bonding; introduction to nuclear chemistry and the law of radioactive decay. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisite: Grade 12 Chemistry (SCH4U) is recommended. Credit restriction: CHEM 1800U. Note: Students without the chemistry prerequisite will be responsible for making up background material.

CHEM 1020U Chemistry II. Introduction to the fundamental principles governing chemical transformations. Thermochemistry and thermodynamics (energy, heat, enthalpy, entropy and free energy); the rates of reaction and reaction mechanisms; chemical and ionic equilibria; buffers; introduction to organic chemistry and the reactions of organic compounds; polymer chemistry; redox reactions and electrochemistry. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisite: CHEM 1010U. Credit restriction: CHEM 1800U.

CHEM 1800U Chemistry for Engineers. Introduction to the four sub-disciplines of modern chemistry: analytical, inorganic, organic and physical. Atoms, molecules, stoichiometry and gas laws; reactions, chemical kinetics, thermochemistry, entropy and free energy; electronic structure of atoms, bonding and molecular structure with emphasis on organic molecules; intermolecular forces, liquids and solids; electrochemistry, fuel cells and electrolytic cells. 3 cr, 3 lec, 2 lab (biweekly), 1.5 tut (biweekly). Prerequisite: Grade 12 Chemistry (SCH4U). Credit restrictions: CHEM 1010U, CHEM 1020U.

CHEM 2010U Structure and Bonding. An introduction to modern inorganic chemistry which provides a systematic overview of bonding theories designed to explain molecular arrangements, with emphasis on structure and reactivity. An introduction to transition group elements, as well as the use of modern structural methods to determine composition, structure and bonding. 3 cr, 3 lec, 1 tut. Prerequisites: CHEM 1020U, MATH 1020U, PHY 1020U or PHY 1040U.

CHEM 2020U Introduction to Organic Chemistry. An introduction to the principles and techniques of organic chemistry, including a study of the correlation of reactions and physical properties of organic compounds with structure and energetic concepts; structure, bonding, properties, reactions and synthesis of mono-functional aliphatic and aromatic compounds; stereochemistry and reaction mechanism theory; study of infrared, nuclear magnetic resonance and mass spectroscopy. 3 cr, 3 lec, 4 lab (biweekly), 1.5 tut. Prerequisite: CHEM 1020U.

CHEM 2030U Analytical Chemistry. A study of the principles of analytical chemistry through demonstrations of applications in chemistry, biology, medicine and the study of the environment. Includes: standard analytical chemistry techniques based on chemical equilibrium, volumetric analysis, analytical electrochemistry; use of buffers for pH control; statistical treatment of analytical data. 3 cr, 4 lec, 4 lab. Prerequisite: CHEM 1020U. Credit restriction: CHEM 2130U. This course is intended for students registered in the Chemistry, Energy and the Environment (chemistry specialization) and Forensic Science programs.

CHEM 2040U Thermodynamics and Kinetics. Classical thermodynamics: first and second laws, Gibbs and Helmholtz functions, chemical potential; phase diagrams, applications to phase equilibrium in one, two, and many component systems, Gibbs phase rule; phase diagrams for steels and other alloys; behaviour of real gases; steam tables. Chemical kinetics: gas phase kinetics; Arrhenius rates; enzyme kinetics. 3 cr, 3 lec, six 4-hr labs, six 1.5-hr tut. Prerequisites: CHEM 2030U or CHEM 2130U. MATH 1020U. Credit restrictions: CHEM 3140U, ENGR 2640U, PHY 2050U.

CHEM 2120U Organic Chemistry (formerly CHEM 3020U). Mechanistic analysis of chemical reactivity of common functional groups with a focus on nucleophilic substitutions at carbonyl centres, functional group transformations in organic synthesis; aromatic chemistry, alkanes, alkyl halides, alkynes, alkenes, and alcohols; carbohydrates, amino acids, proteins, heterocycles; applications of spectroscopic techniques. 3 cr, 3 lec, 4 lab. Prerequisite: CHEM 2020U.

CHEM 2130U Analytical Chemistry for Biosciences. A study of the principles of analytical chemistry through demonstrations of applications in chemistry, biology, medicine and the study of the environment. Includes: standard analytical chemistry techniques based on chemical equilibrium, volumetric analysis, analytical electrochemistry; use of buffers for pH control; statistical treatment of analytical data. 3 cr, 3 lec, 4 lab (biweekly), 1.5 tut (biweekly). Prerequisite: CHEM 1020U. Credit restrictions: CHEM 2030U. This course is intended for students in biological science programs.

CHEM 3040U Fundamentals of Physical Chemistry. Thermodynamics concepts including solution thermodynamics, phase equilibria, and electrochemistry; transport phenomena, the random walk problem and diffusion; introduction to statistical mechanics including probability distributions and entropy, fluctuations, the Boltzmann distribution, and partition functions and their relation to thermodynamic functions. 3 cr, 3 lec, 3 lab. Prerequisite: CHEM 2040U.

CHEM 3120U Advanced Organic Chemistry (formerly CHEM 4020U). Application of advanced synthetic methodologies used in modern organic synthesis. Emphasis will be placed on the use of retrosynthetic analysis, stereochemical control, and protection/deprotection schemes. 3 cr, 3 lec, 4 lab. Prerequisite: CHEM 3220U.

CHEM 3140U Physical Chemistry for Biosciences. This course provides a study of the principles of physical chemistry, with an orientation to the biological sciences. Topics include: classical thermodynamics, solution thermodynamics, chemical equilibrium, electrochemistry, acids and bases, phase equilibria, chemical kinetics, pharmacokinetics, enzyme kinetics, spectroscopy, photobiology, macromolecules. 3 cr, 3 lec, 1 oth. Prerequisites: CHEM 1020U, MATH 1020U. Credit restrictions: CHEM 2040U, PHY 2050U.

CHEM 3220U Structure Determination of Organic Molecules. This course explores the theory and the application of mass spectrometry, and NMR, ultraviolet/visible, and IR spectroscopy to the structure determination of organic molecules. 3 cr, 3 lec. Prerequisite: CHEM 2120U.

CHEM 3510U Inorganic Chemistry I. This is a course in the coordination chemistry of the classical (Werner) transition metal ions. Description of the solid state including close packing, lattice structures, radius rule, lattice energies, MO's, and semiconductor applications. Description of the solution state including Lewis acid-base theory, HSAB theory, aquo ion Bronsted acidity, ligand exchange kinetics, formation constants, thermodynamics, and chelate effect. Ligand field theory including crystal field splittings, MO diagrams and use of group theory, theoretical principles of UV-visible spectroscopy, Orgel and Tanabe-Sugano diagrams, magnetism and redox. Descriptive chemistry of the first row transition metal ions including oxidation states, complexation behaviour, and bio-organic examples. 3 cr, 3 lec, 4 lab. Prerequisite: CHEM 2010U. Note: Students are expected to take CHEM 3520U in the following semester.

CHEM 3520U Inorganic Chemistry II. Organometallic chemistry and metal catalysis of the transition metals. Survey of organometallic complexes including, but not limited to, metal carbonyls and carbonyl clusters, metal-(alkyls, alkenes, alkynes, allyls, and aryls) and metallocenes. Structure, bonding and MO diagrams, use of group theory. IR and group theory predictions, fluxional molecular motions, and characterization by NMR spectroscopy. Synthesis and reactions of carbonyl, alkene, and aryl complexes. Detailed coverage of homogeneous and heterogeneous metal catalyses and applications in industrial processes. 3 cr, 3 lec, 4 lab. Prerequisite: CHEM 3510U. Note: Students are expected to take this course immediately after CHEM 3510U.

CHEM 3530U Instrumental Analytical Chemistry I. Instrumental methods of trace chemical analysis. This course deals with the scope and use of instruments in chemical analysis, and the theory and applications of separation methods involving chromatography, and atomic and molecular spectroscopy. A range of analytical techniques is examined including gas chromatography, liquid chromatography, capillary electrophoresis, atomic absorption and emission, mass spectrometry, and ultraviolet/visible spectroscopy. 3 cr, 3 lec, 4 lab (weekly). Prerequisites: CHEM 2030U, CHEM 2040U. Credit restriction: CHEM 3830U. Note: Students are expected to take CHEM 3540U in the following semester.

CHEM 3540U Instrumental Analytical Chemistry II. A continuation of Instrumental Analytical Chemistry I. This course deals with the theory and applications of electroanalytical chemistry, thermal analysis, radiochemical methods, and X-ray, infrared and Raman spectroscopies. A range of analytical techniques is examined including potentiometry, coulometry, voltammetry, x-ray fluorescence, electron microscopy, infrared, Raman and X-ray photoelectron spectroscopies. 3 cr, 3 lec, 4 lab (weekly). Prerequisite: CHEM 3530U. Credit restriction: CHEM 3830U. Note: Students are expected to take this course immediately after CHEM 3530U.

CHEM 3830U Instrumental Analytical Chemistry. A one-semester course dealing with instrumental methods of trace chemical analysis. The theory and applications of ultraviolet/visible, infrared and atomic absorption spectroscopy are described. Other common techniques are examined, including X-ray fluorescence, mass spectrometry, gas chromatography, nuclear activation analysis and high performance liquid chromatography. 3 cr, 3 lec. Prerequisite: CHEM 2030U or CHEM 2130U. Credit restrictions: CHEM 3530U, CHEM 3540U.

CHEM 4010U Industrial Chemistry. An introduction to the principles and practices of industrial chemistry with a survey of the chemical industry, pollution control, plant design, corrosion and similar topics. Selected industrial processes will be discussed, such as production of primary petrochemicals; plastics and synthetic fibres; pharmaceutical agents; insecticides, herbicides and insect pheromones, dyes, detergents, perfumes and flavours. 3 cr, 3 lec. Prerequisites: CHEM 2120U, CHEM 3520U.

CHEM 4040U Physical Chemistry. An introduction to phenomena at surfaces and interfaces: colloids, adsorption, thermodynamic treatments and examples of technological applications. The course describes modern methods to characterize surfaces in materials science and chemical dynamics at electrode interfaces. 3 cr, 3 lec, 3 lab. Prerequisites: CHEM 3040U, CHEM 3540U. Recommended prerequisites: MATH 2050U, MATH 2060U.

CHEM 4050U Environmental Chemistry. Major chemical pollutants: their sources, the environmental reactions they undergo, and how they become distributed throughout the environment. Topics will be chosen from the major environmental toxicants: pesticides, natural products, inorganics, and industrial chemicals. The course explores the principal means of chemical and biological degradation of toxicants, and the processes by which chemicals move, concentrate, and dissipate. The details of the chemistry occurring in the earth's atmosphere are examined. 3 cr, 3 lec. Prerequisites: CHEM 2020U, CHEM 3830U or CHEM 3540U.

CHEM 4060U Quantum Chemistry and Spectroscopy. This course offers a modern review of Quantum Theory in application to Chemistry. Starting from basic principles of quantum mechanics, their use is illustrated for such exactly solvable problems as harmonic oscillator, rigid rotator, and hydrogen atom. Approximate methods are then introduced for more complex systems including those with many electrons. Relevant aspects of spectroscopy associated with each degree of freedom (vibrational, rotational, electronic) are discussed as well. Computational examples are employed throughout. 3 cr, 3 lec. Prerequisite: CHEM 3040U. Strongly recommended prerequisites: MATH 2050U, MATH 2060U.

CHEM 4070U Fossil Fuels and Biomass. This course will address future world energy needs and sources and focus on the continued use of fossil fuels and the use of biomass, especially in developing countries. Students will study origins and compositions and conventional processing of these sources of energy. Topics will also include the production of ethanol and methane from biomass; origins, effects and methods of reducing acid rain; CO2 and enhanced greenhouse gas effect; and the concept of total cost analysis, with some simple examples. 3 cr, 3 lec, 2 tut. Prerequisites: CHEM 2020U; CHEM 2040U or PHY 2050U; ENVS 2010U, ENVS 3020U.

CHEM 4080U Hydrogen-Based Energy Systems and Fuel Cells. This course explores hydrogen as an energy carrier and its conversion in hydrogen fuel cells. The focus is on polymer electrolyte fuel cells, but the course includes a brief discussion of phosphoric acid, alkaline, and solid oxide fuel cells, as well as other types of fuel sources such as methanol and natural gas. The thermodynamic aspects of a hydrogen economy are discussed, encompassing production (reforming, electrolysis), storage (compression, solid matrix), transportation, and usage in fuel cells. With regards to fuel cells, the main focus will be on general operating principles, electrochemistry, thermodynamics (efficiency, losses), and mass and heat transport phenomena, including two-phase flow. A general picture of i) current scientific challenges and ii) device modelling of fuel cells will emerge. 3 cr, 3 lec. Prerequisites: CHEM 1020U, CHEM 2040U.

CHEM 4110U Bio-Organic Chemistry. This course will explore the structure and function of biological molecules including proteins, nucleic acids, carbohydrates, lipids, and alkaloids. Pharmaceutical implications will also be discussed. 3 cr, 3 lec. Prerequisite: CHEM 2120U.

CHEM 4120U Advanced Topics in Biological Chemistry. This course will explore a range of current research topics at the intersection of chemistry and biology that are recently reported in the scientific literature. The course covers the following topics: protein engineering, enzymology, enzymatic synthesis, biotransformations, and bioinorganic chemistry. 3 cr, 3 lec. Prerequisite: CHEM 4110U.

CHEM 4410U Chemistry Thesis Project I. The thesis project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study and to satisfy specific objectives and requirements. The project will be selected to include research that has been approved by the supervising faculty member. Students will submit a progress report at the end the first semester. Once all work is completed, each student must submit a thesis and make a presentation based on their research in the following semester. 3 cr, 9 oth. Prerequisites: Students will have completed 90 credit hours in their area of specialization and be in clear standing, and must obtain prior consent of a faculty member. Note: Students are expected to take CHEM 4420U in the following semester.

CHEM 4420U Chemistry Thesis Project II. A continuation of the project started in CHEM 4410U. Students will make presentations based on their research and submit a written thesis. 3 cr, 9 oth. Prerequisite: CHEM 4410U. Note: Students are expected to take this course immediately after CHEM 4410U.

CHEM 4430U Directed Studies in Chemistry. This course requires independent research of a current topic in a specialized area of chemistry, including, but not restricted to, organic, inorganic, physical, analytical and computational chemistry. The topic will be selected from recent research literature and involve a review and critical appraisal of underlying experimental principles. The course comprises independent library research, participation in weekly meetings, and written and oral presentations. 3 cr, 1 lec, 2 oth. Prerequisites: Students will have completed 90 credits in their Chemistry program and be in clear standing. Students must also obtain prior consent of a faculty member.

CHEM 4510U Pharmaceutical Discovery. This course explores topics in the drug discovery process from the discovery of lead molecular candidates to their optimization as drug candidates. Topics include natural products drug discovery; combinatorial chemistry; medicinal synthetic organic chemistry. 3 cr, 3 lec. Prerequisite: CHEM 3120U.

CHEM 4520U Advanced Topics in Pharmaceutical Chemistry. This course covers current research topics in pharmaceutical chemistry with a focus on techniques that facilitate a drug candidate's entry into the marketplace. Topics include molecular modelling, pharmacokinetics, and pharmaceutics. 3 cr, 3 lec. Prerequisite: CHEM 4510U.

COMM 1050U Technical Communications (formerly EDUC 1050U). This course will assist students in developing professional writing and presentation skills required for university assignments and for their professional work in the future. It will start with basic writing and speaking skills and will emphasize their application in the preparation of reports and other technical writing. Topics for the course include using correct grammar and punctuation, organizing ideas, formulating persuasive arguments, and preparing narrative and written technical reports. Part of the process will involve students in the critical analysis of the writing and speaking of others as a means of developing one's own skills. 3 cr, 3 lec, 1 tut. Credit restriction: EDUC 1050U.

COMM 1100U Introduction to Communication. This course introduces the fundamental concepts of communication theory and practice and provides an overview of the field. Students will examine theoretical concepts, how communication takes place, and good communication skills, learning how these are applied to successful and efficient communication practice. It will include case studies, team projects, and communication workshops. 3 cr, 2 lec, 1 tut.

COMM 1110U Developments in Human Communication. This course examines the origins and historical development of human communication. It will provide a comprehensive overview of how communication has been shaped by social, political, and economic forces. It will also seek to put the development of communication forms and technologies in their proper historical context, using case studies to analyze how they were received and used. 3 cr, 2 lec, 1 tut.

COMM 1220U Reading Our World. This course offers an introduction to the reading and analysis of various kinds of contemporary texts. It examines the links between language and contemporary social and political issues and emphasizes the close relationship between critical thinking, critical reading and critical writing. The choice of texts is designed to promote close engagement with works that address issues of importance (e.g. cultural and ethnic diversity, ecology, politics, and terrorism) in our contemporary world. 3 cr, 3 lec.

COMM 1310U Fundamentals of Professional Writing. This course introduces the elements of skilful professional writing: clarity, coherence, style, grammar and punctuation. It will cover the fundamental principles of business, scientific, technical, and scholarly writing. A series of writing projects will help students improve their writing skills. 3 cr, 3 lec. Credit restriction: COMM 1050U, WRIT 1001T, SSCI 1910U.

COMM 1320U Oral Communication and Public Speaking. This workshop-based course covers the fundamentals of oral communication, public speaking, successful debating, and speech writing. Students will learn to prepare and present their ideas effectively and professionally. They will also learn how to chair meetings, debate ideas, and present opinions effectively. The workshop will provide constructive analysis of both live and videotaped performance experiences. Listening and peer evaluation are an integral part of this course. 3 cr, 3 lec.

COMM 1420U Computer Skills. This elective course is designed for students with minimal computer skills, and should be taken before the Computer mediated Communication course. It will consist of lab sessions designed to enhance skills in Microsoft Word, PowerPoint and Excel, as well as the basics in graphics, web design and other technologies. 3 cr, 3 lec/lab.

COMM 1610U Interpersonal Communication (formerly COMM 2610U). This course considers the nature and function of interpersonal and small group communication. It is designed to foster an understanding of language, culture, and human behaviour that will contribute to improved communication skills in the students' personal and professional lives. Workshop exercises are designed to improve the interpersonal skills necessary for effective communication, management, listening, conflict resolution, negotiation, selling, and persuading. 3 cr, 3 lec.

COMM 2110U Foundations of Communication Theory. This course introduces the fundamentals of human communication, including its physical, linguistic, psychological, and sociological bases, and examines some of the major perspectives in communication theory. It covers the main American and European schools of thought, from the technological (McLuhan prophesies) to the symbolic and socio-political dimensions (feminist and cultural studies). Case studies will illuminate how theory underpins real-life communication practice. 3 cr, 3 lec. Prerequisite: 15 credit hours of COMM.

COMM 2210U Communication and Culture. This course examines the interrelationships between communication and culture. It provides a brief introduction to some of the theories and methods we use to analyze, comprehend, and read modern culture. These theories are applied in the analysis of various communication forms and genres, including text, photography, television, film, drama, and music. Students will do independent research and write critiques of several cultural products. The course will touch upon the commercialization of cultural production as well as issues of cultural hegemony and the globalization of culture. 3 cr, 3 lec. Prerequisite: 15 credit hours of COMM.

COMM 2220U The Media and Communications in Canada. This course examines the history and political economy of the media industries, including publishing, film, radio, television and newer communication technologies. The effect of media on culture, society, politics and economics will be discussed. Special topics will include the ownership and control of media, the process of television information production, and the dynamics of media reception. Not offered every year. 3 cr, 3 lec. Prerequisite: 15 credit hours of COMM.

COMM 2230U Film and Video. This course provides a foundation in the creative, critical, and technical aspects of film and digital video production, including an introduction to non-linear editing software. Collaborative assignments allow students to discover the shared and distinct language of each medium. The course introduces the process of audiovisual production: directing, storyboarding, visual and audio recording, and editing. Not offered every year. 3 cr, 3 lec. Prerequisite: 15 credit hours of COMM.

COMM 2240U Television. The phenomenon of television is considered by many to be one of the defining social, political and cultural features of post-war mass consumer culture. It has contributed in fundamental ways to experiences of ourselves and our society. In this course, students will explore the origins, use, development, characteristic genres and critical reviews of television as a mass medium. By the end of the course, students will be familiar with the basic debates and critical frameworks that structure television studies. Not offered every year. 3 cr, 2 lec, 1 tut.

COMM 2250U Mass Communication and Popular Culture. This course introduces the major theoretical, structural, economic, technological, and institutional dimensions of mass communication and popular culture systems. Students will learn to recognize that the meaning, form, and value of cultural products cannot be separated from the social context in which they are produced and received. Not offered every year. 3 cr, 3 lec. Prerequisite: 15 credit hours of COMM.

COMM 2260U Language, Culture, and Society. An introduction to the study of language in its social and cultural context. Students will be introduced to research in the ethnography of communication, sociolinguistics and linguistic anthropology. The course will cover topics relating language to gender, class, politics, and ethnicity. 3 cr, 3 lec. Prerequisite: COMM 2250U. Not offered every year.

COMM 2310U Advanced Professional Writing and Editing. This course will build upon the first professional writing course to develop skills in efficient research, organization, composition and the development of persuasive, logical arguments. A series of writing projects will help students to develop a rhetorically grounded approach for analyzing communication situations and then designing and writing documents for various professional situations (resumes, letters of inquiry, proposals and press releases). A portion of course time will be given to developing and honing good editing skills. 3 cr, 3 lec. Prerequisite: COMM 1310U.

COMM 2410U Communication and Technology. This course builds upon the Developments in Human Communication course to consider the effects of recent technologies on communication and modern society. It will introduce the new technologies and will critically examine the impact they have on the way we communicate with others in interpersonal relationships, in organizational situations, in cross-cultural situations and in political situations. Case studies will be used to analyze and critique the spread of recent phenomena such as text messaging, MSN, blogging, YouTube, Facebook, MySpace, Flickr, to name a few. 3 cr, 3 lec. Prerequisite: 15 credit hours of COMM.

COMM 2411U Computer-mediated Communication (formerly COMM 1410U). This course will focus on how we use computers to gather, analyze and present information, and to communicate and build social relations. It emphasizes creative and critical thinking through presentation of prevalent new media theories, analysis of case studies and discussion of practical applications of computer-mediated communication in different social, political and cultural contexts. Students will engage in web research to develop the skills necessary for overseeing and developing online information in a range of online contexts. 3 cr, 3 lec. Prerequisite: COMM 1610U, COMM 2110U or COMM 2210U. Credit restriction: COMM 1410U.

COMM 2510U Business Communication. This course explores some of the applications of good communication practice in advertising, marketing, and public relations. It reviews the importance of effective communication strategies in successful business ventures, and introduces the field of e-commerce. Students are encouraged to put their knowledge to work through case studies and simulations. 3 cr, 3 lec. Prerequisite: COMM 1610U.

COMM 3110U Communication Ethics. This course examines ethical issues as they arise in interpersonal communication, mass communication media (TV, newspapers, Internet, etc.), and in the formation of public policy and law. The dominant moral theories and approaches to moral decision making will be analyzed and put to use to help students understand and evaluate concrete examples and case studies. The course will include topics such as objectivity, freedom of expression, representations of sex, violence and other human behaviour, privacy, confidentiality and obligations to the public. 3 cr, 1 lec, 2 tut. Prerequisites: COMM 2110U and third-year standing in Communication.

COMM 3310U Writing for Publication. This course introduces the basics of writing for newspapers, in-house newsletters, and general interest and consumer-specific magazines and journals, covering topics such as investigation, interviewing, reporting, and feature writing. Students develop interviewing techniques, note-taking methods, editing skills, and analyze the importance of accuracy, fairness, voice, precision, style and speed in writing. The course will teach students how to tighten writing, sharpen leads, apply Canadian Press style, write headlines, and apply the principles of layout. 3 cr, 3 lec. Prerequisites: COMM 2310U or equivalent and third-year standing in Communication.

COMM 3320U Writing for Business and Government. This course develops the techniques of research, organization, and writing that produce professional material for business and government. Students practice writing based on real work situations, thus learning the practical skills required to write effectively in a variety of circumstances. Situation-based assignments will put theory into practice, giving students practice in writing resumés, proposals, instructions, and press releases for business and government; in preparing material for web pages and PowerPoint presentations; and in developing specialized information for non-expert audiences. 3 cr, 3 lec. Prerequisites: COMM 2310U or equivalent and third-year standing in Communication.

COMM 3330U Scientific and Technical Writing. This course provides an overview of technical and scientific writing style and standards. It reviews the processes involved in research, writing, revision, and presentation of scientific and technical texts. Regular assignments will focus on information retrieval, data recording and organization, documentation, memos, short and long reports, and graphics, as well as special problems in scientific and technical writing, such as definitions, instructions, process explanations, abstracts, and descriptions of products. 3 cr, 3 lec. Prerequisites: COMM 2310U or equivalent and third-year standing in Communication.

COMM 3410U Web Design/Multimedia Authoring. This course will provide an introduction to the principles of web design as well as the basic technical skills for developing interactive multimedia. Students will learn about current multimedia tools used to create CD-ROM and web-based products, with ample opportunity for practice. They will also learn authoring tools and multimedia techniques while covering topics including non-text based communication, integration of visuals, animation of text and graphics and digital video editing and deployment. 3 cr, 1 lec, 2 lab. Prerequisites: COMM 2411U or equivalent and third-year standing in Communication.

COMM 3420U Human-Computer Interaction. This course introduces some theoretical, methodological, and practical issues in the study of human-computer interaction. A discussion of prevalent theories and recent research in the field will be followed by case studies and practical assignments. Some of the topics that will be covered include intelligent interface designs, usability assessment, user modelling and the accessibility of technology for the disabled. Related behavioural investigations concerning the ease and efficiency of users' interactions with computerized environments will also be discussed. 3 cr, 3 lec. Prerequisites: COMM 2411U or equivalent and third-year standing in Communication.

COMM 3510U Organizational Communication. This course provides a framework for understanding communication in organizations. Communication teams in organizations today provide not only logistical support like writing and speaking, but also creative and strategic thinking and active participation in planning. The course will examine how various information technologies are used to manage knowledge in an organization to streamline processes, to increase efficiency and competitiveness and to enhance internal and external communication. The course also considers organizational structures and their effect on management styles to information use; power and conflict within the organization; and the role of unions and politics in management. 3 cr, 3 lec. Prerequisite: Third-year standing in Communication.

COMM 3520U Public Relations. This course includes the foundational theories of public relations, an exploration of the public and an introduction to strategic planning. Topics to be covered include the principles and responsibilities of public relations, the analysis of public relations strategies, issues within public relations counselling, management of organizational issues, elements of crisis communication and issues in leadership and management. 3 cr, 3 lec. Prerequisites: COMM 2510U and third-year standing in Communication.

COMM 3530U Advertising and Marketing Communication. This course critically examines the place of advertising in contemporary consumer society. Topics to be covered include the construction of desire, the significance of advertising to the production and circulation of commodities, and the role of advertising and consumption in the construction of social identity. Theoretical principles will be applied to practice in a series of interactive and collaborative exercises. Some real-life advertising campaigns will be critiqued and reworked. 3 cr, 3 lec. Prerequisites: COMM 2510U and third-year standing in Communication.

COMM 3610U Persuasion, Argumentation and Negotiation. This course covers the fundamental issues involved in argumentation and persuasion. Topics will include the principles of deductive and inductive reasoning, formal and informal arguments, and how to evaluate scientific explanation. Students are taught how to analyze and critique the reasoning and logic in written and spoken communication and how to use valid and sound arguments in presentations, letters, memos, reports, proposals, and news releases. Workshops will apply this learning to practical situations such as advertising and selling products, crisis management, and public opinion manipulation. 3 cr, 2 lec. 1 tut. Prerequisite: Third-year standing in Communication.

COMM 3710U Intercultural Communication. This course examines communication in an intercultural context, where it is affected by divergent value systems, differing levels of technological adaptation, and unequal power configurations. The course will focus on relationships between people of diverse racial, ethnic, national, linguistic and religious backgrounds. Topics will include language and perception; emotions across cultures; culture and advertising; body language; and, cultural stereotyping. Workshops focus on strategies for cross-cultural collaborative problem-solving techniques, giving students the skills necessary to act as intermediaries between cultures. 3 cr, 2 lec, 1 tut. Prerequisite: Third-year standing in Communication.

COMM 3720U Communicating Diversity: Race, Ethnicity and Gender. This course addresses practical and theoretical issues of race, ethnicity, and gender that have become focal points for current debates in public cultural expression. Themes to be discussed are the implications of cultural, racial, and sexual differences; the (mis)representation of multicultural, multiracial, and sexual minorities in the media; and the implications of employment equity, human rights, and other legislation. Theoretical readings which frame issues of cultural, racial, and gender representation will be followed by projects that develop successful strategies for communicating diversity. 3 cr, 3 lec. Prerequisites or corequisites: COMM 3710U and third-year standing in Communication.

COMM 4110U Communication Research in Practice. This course introduces students to the major research approaches in communication and acquaints them with a variety of quantitative and qualitative methods used in the field. It familiarizes students with the formation of research questions, the choice of appropriate methodological tools, and the interpretation and reporting of research findings. Students will gain experience in using research findings to underpin communication reports, strategic plans, press releases, and research projects. 3 cr, 1 lec, 2 tut. Prerequisite: Fourth-year standing in Communication.

COMM 4120U Senior Seminar: Professional Practice. This seminar will consist of lectures by faculty, workshops by professionals, discussion in seminars, and individual meetings. The focus of this course is on reviewing, expanding and consolidating the learning that has taken place during the program. The students will listen to presentations on current research and professional practice in the field, will debate the code of ethics that underlies their profession and will articulate a personal code of professional conduct. They will prepare a communication plan, a strategic management plan and the research and design plan for their own capstone project in the second term. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Communication.

COMM 4130U Capstone Project. This project will be overseen by a faculty mentor and will be the equivalent of a 20-30 page university essay. It can be a communication report, a strategic management plan, a cultural product (such as a video or publishable article), a research report, an essay, or a literature review. 3 cr. Prerequisite: Fourth-year standing in Communication.

COMM 4140U Rhetoric. The concept of rhetoric will be introduced in its usual association with the power of language to liberate, emancipate, control and deceive the public. It will then be explored further as a technique for the production of public knowledge, public argument, public action, public response, and public critique. To better understand the relationship between rhetoric, policy and ethics, learners will examine the consequences of particular rhetorical strategies in, for example, risk analysis, engineering policy, medical and scientific research, welfare reform, and nation building. We will use these findings to analyze discourse in government hearings, agency records, private documents and public policy debates in Canada. Not offered every year. 3 cr, 3 lec. Prerequisite: COMM 3610U.

COMM 4210U Interpretive Practices. This course will expand upon the work done in Communication and Culture. It focuses on problems in cultural interpretation, analyzing the specific nature, systems, and processes of interpretation. Students will study how written or spoken statements, gestures, and aesthetic objects have meanings; how we recognize or fail to recognize such meanings; and, how we communicate meaning. It will explore the diverse field of cultural studies, examining contemporary theories that are applied to the interpretation of culture and communication: discourse analysis, feminism, Marxism, post-colonialism, post-structuralism, and their more recent offshoots. Students will apply these theories to the interpretation of films, literary texts, music, and art, focusing on how these cultural products communicate in the modern world. Not offered every year. 3 cr, 3 lec. Prerequisites: COMM 2210U and fourth-year standing in Communication.

COMM 4510U Strategic Management Communication. This course considers strategic management in areas such as risk communication, disaster mitigation communication and reputation management. It builds upon earlier courses in public relations and advertising, with a focus on learning how to prepare and implement effective strategic communication plans for a variety of situations. A wide range of examples and case studies will be examined. Not offered every year. 3 cr, 3 lec. Prerequisites: COMM 2510U and fourth-year standing in Communication.

COMM 4520U Advanced Business Communication. This course builds upon earlier Business Communication courses with special emphasis on recent trends in marketing and commerce. 3 cr, 3 lec. Prerequisites: COMM 2510U and fourth-year standing in Communication.

COMM 4530U Communications Consulting. This course examines the role and function of a consultant. It covers methods and strategies of consulting: making contact, preparing a proposal, researching and diagnosing communication problems, preparing a report, making recommendations, and suggesting follow-up action. It also covers the basics of setting up a consultancy, managing small business finances, and advertising services. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Communication.

COMM 4610U Mediation and Conflict Management. This course examines ways of preventing, resolving, and transforming conflicts in situations ranging from everyday family life through business situations to large-scale political conflicts. Various theories of conflict management will be applied to case studies and interactive exercises will hone mediation and negotiation skills learned in previous courses. Students will analyze the assets and liabilities of alternative forms of dispute resolution. 3 cr, 3 lec. Prerequisite: COMM 3610U.

COMM 4710U Globalization and International Communication. This course considers the role and significance of globalization and information technologies in the formulation of relationships between people of diverse racial, ethnic, national, linguistic, and religious backgrounds. Case studies will illuminate the challenges that globalization, new information and communication technologies present to traditional, culturally bound beliefs and values. It will analyze how the rapid growth of multinational communication industries has shaped the modern world. The role of new media in security, terrorism, foreign policy, and conflict resolution will be probed, with special consideration given to current issues and ongoing global events. 3 cr, 3 lec. Prerequisite: COMM 3710U.

COMM 4720U Communication for Social Change. This course examines the theories, methods and practices of communication for social change. The principles of public communication and media analysis will be applied to the design, strategy and implementation of communication planning, programs and campaigns around social issues. Themes and issues addressed in this course include: communication as action and intervention; public participation and the media; communication and social change; the conflation of social and commercial advertising; corporate claims of social responsibility; sustained communication; advocacy; social marketing perspectives; and others. A wide range of case studies will be examined. 3 cr, 3 lec. Prerequisite: COMM 3710U.

COMM 4810U Special Topics. In this course, students will undertake in-depth examinations of selected topics in communication, culture and information technology. Topics vary from year to year, and the content in any given year depends upon the instructor. Some internships will be made available for upper-level students to gain work experience in the field of communication. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Communication.

CSCI 1000U Scientific Computing Tools. This course provides a working introduction to software tools employed in the scientific workplace, and used in UOIT science programs. Modules will be included on: data management (spreadsheets, databases), computational tools (Maple, MATLAB), scientific text processing and graphics (LaTeX, SigmaPlot, and others), presentation tools (PowerPoint, LaTeX), introductory Linux, and various other software tools useful in different branches of science. Part of the course grade will include a student presentation. 3 cr; this course is offered in a hybrid format, involving 1.5 lec, 1.5 tut and online self-learning material. Prerequisite: Enrolment in a science program, or background and interest in science. Credit restriction: CSCI 1800U.

CSCI 1030U Introduction to Computer Science. This course covers the basic concepts of computer science, as well as providing an introduction to computer programming. Topics covered include an overview of computer science, basic computer architecture, algorithms and data structures, computer networks, program design, control structures, basic I/O, procedures and functions, and object oriented programming. 3 cr, 3 lec, 3 lab. Credit restrictions: BUSI 1830U, CSCI 1020U, CSCI 1040U, CSCI 1600U, ENGR 1200U, INFR 1100U.

CSCI 1040U Introduction to Computer Science with Python. This course covers the basic concepts of computer science, as well as providing a gentle introduction to computer programming. Topics covered include an overview of computer science, basic computer architecture, algorithms and data structures, computer networks, program design, control structures, basic I/O, procedures and functions, and object oriented programming. The laboratory and assignments are based on the Python programming language. This course is intended for students who want an introduction to computer science, but don't want to specialize in the field. 3 cr, 3 lec, 3 lab. Credit restrictions: BUSI 1830U, CSCI 1020U, CSCI 1030U, CSCI 1600U, ENGR 1200U, INFR 1100U.

CSCI 1200U Computers and Media. This course investigates the influence that computers have had on modern media, including the production process and industry structure. The media forms that will be discussed include film, video, music, animation and games. Topics to be covered include the digital delivery of media, the changing role of the viewer, the difference between interactive and non-interactive media and the democratization of media production. 3 cr, 3 lec, 1.5 tut.

CSCI 1800U Computing Tools for Health Science. This course covers the use of various software tools for use in the UOIT web centric and laptop environment in certain programs within the Faculty of Health Science. It may be taken in place of CSCI 1000U Scientific Computing Tools by students in the Health Science program who are not planning on taking physics or mathematics courses. Modules will be included on: scientific graphing, document processing and basic graphics tools, data management (spreadsheets and databases), web authoring tools, and scientific presentations. Most of the software items are pre-installed on the laptops, but some will be accessed remotely via the web. Practical use and application of the tools will include health related situations. 3 cr; this course is offered in a hybrid format, involving 1.5 lec, 1.5 tut and online self-learning material. Prerequisite: Enrolment in the Health Science program, or background and interest in science. Credit restriction: CSCI 1000U.

CSCI 2000U Introduction to Mathematical Computing. This course consists of a sequence of modules to develop scientific problem-solving and presentation skills using modern software. Problem-Solving Environments (PSEs) such as Maple or Matlab are particularly emphasized, as are more specialised mathematical software tools. Topics include: elementary symbolic and numeric computing; two- and three-dimensional graphics; data structures, control flow, & programming; problem-solving in calculus and linear algebra using PSEs; scientific publication and presentations; web authouring tools and basic HTML. 3 cr, 3 lec, 1 tut. Prerequisite: MATH 1020U. Note: Students will benefit from taking MATH 2010U and MATH 2050U along with this course.

CSCI 2010U Principles of Computer Science. This course introduces students to general computer programming principles and the analysis of algorithms and data structures. Topics include problem analysis, design of algorithms and programs, selection of data types, decision-making, and program correctness. The course uses an object-oriented programming language such as Java or C++. Applications to business, science and engineering are illustrated. The focus is on the effective choice of algorithm and data structure and the use of a disciplined programming style which permits programs to be understood and read by others. 3 cr, 3 lec, 1.5 lab. Prerequisite: CSCI 1020U or CSCI 1030U. Corequisite: CSCI 2110U or MATH 2080U.

CSCI 2020U Software Systems Development and Integration. This course is an introduction to the tools and techniques used in modern software development. Topics covered include configuration management, software design, coding standards, software testing and maintenance, basic software tools, software libraries, graphical user interfaces and network programming. 3 cr, 3 lec, 1.5 lab. Prerequisite: CSCI 2010U.

CSCI 2030U Programming Workshop. This is an intensive course on computer programming that covers both theory and practice. The lectures introduce modern concepts in program design and construction along with advanced features of modern object oriented programming languages. The laboratories and assignments provide an opportunity to apply these concepts to practical programming problems. Topics that are covered in this course include program design, problem solving strategies, program documentation, object oriented program design, inheritance, templates and standard template libraries. 3 cr, 3 lec, 3 lab. Prerequisite: CSCI 1020U or CSCI 1030U.

CSCI 2050U Computer Architecture I. This course introduces the basic ideas of computer organization and underlying digital logic that implements a computer system. Starting from representation of information, the course looks at logic elements used for storing and processing information. The course also discusses how the information storage and processing elements are linked together to function as a computer system. Students become familiar with the basic hardware components of a system and how they are connected, and see how secondary storage, registers and control units must co-ordinate to provide an effective environment for application programming. The components of a multi-level memory, and how it interfaces with the I/O and central processor, are examined. 3 cr, 3 lec, 2 lab. Prerequisite: CSCI 1020U or CSCI 1030U.

CSCI 2110U Discrete Structures in Computer Science. This is an elementary introduction to discrete mathematics. Topics covered include first-order logic, set theory, number theory, fundamental techniques of mathematical proof, relations, functions, induction and recursion, combinatorics, discrete probability, finite-state machines, and graph theory. 3 cr, 3 lec, 1 tut. Prerequisite: MATH 1020U. Corequisite: MATH 1850U or MATH 2050U. Credit restrictions: CSCI 1010U, ENGR 2110U, MATH 2080U. Cross-listed: MATH 2080U.

CSCI 2160U Digital Media. This course is an introduction to the representation and processing of media in a digital form. The media covered includes sound, image, video, text, and graphics. Topics covered in this course include sampling, storage and file structures, reproduction, and the processing of different forms of media. Standard software packages for the handling of digital media are also covered. 3 cr, 3 lec, 2 lab. Prerequisite: CSCI 2010U or registration in Digital Media specialization of the BA (Hons) in Communication program.

CSCI 2200U Narrative Structure in the Digital Age. This is an introduction to narrative and how it is used in digital media. The course covers traditional narrative theory and then expands this theory to cover interactive media. Students will apply these concepts to the design of multimedia and games. 3 cr, 3 lec, 1.5 tut. Prerequisite: CSCI 1200U.

CSCI 3010U Simulation and Modelling. This course provides a basic introduction to simulation and modelling. The goal is to provide the student with an appreciation of the role of simulation in various scientific, engineering, and business fields, and to provide some experience in writing simulation programs. This course exposes students to a class of applications which require and demand massive data storage and computational power to make large scale simulations possible. They gain an understanding of the need for parallel and vector processors to solve these problems. 3 cr, 3 lec, 1.5 lab. Prerequisites: CSCI 1020U or CSCI 1030U, MATH 2072U, STAT 2010U.

CSCI 3020U Operating Systems. This course will cover a variety of topics related to computer operating systems, with emphasis on components that are unique to the role of an operating system as the interface layer between the computer hardware and the application software. The course will discuss techniques for sharing the processor, memory, secondary storage and networking between programs. The basics of networking will also be introduced, particularly involving higher protocol levels. Students will learn about the limitations of single processor architecture. This course also familiarizes students with the protocols and network communication techniques that are used to make the overall system reliable and robust. 3 cr, 3 lec, 3 lab (biweekly). Prerequisites: CSCI 2010U, CSCI 2050U. Credit restriction: ENGR 3950U.

CSCI 3030U Database Systems and Concepts. The aim of the course is to provide students with an overview of database management system architectures and environments, an understanding of basic database design and implementation techniques, and practical experience of designing and building a relational database. 3 cr, 3 lec, 1.5 labs. Prerequisites: CSCI 2010U, CSCI 2020U.

CSCI 3040U Software Engineering I: Requirements, Design and Analysis. This course introduces students to the development of software systems including systems that consist of multiple programs with long life cycles. Topics covered in this course include software process, software requirements, software architecture, design patterns, notations, and techniques for software design and analysis. 3 cr, 3 lec, 1.5 labs. Prerequisite: CSCI 2020U.

CSCI 3050U Computer Architecture II. Advanced architecture concepts, such as multi-level memory, caching and vector processors, are introduced in this course so that students are able to appreciate the difficult and complex task involved in the compilation of a high level language. Students become familiar with differing hardware designs and the need for an architecture independent compiler writing technique. They gain an understanding of the need for such language and machine independent techniques. The tools and formalism introduced for compiler construction, while new, are closely related to the formal notation and proof techniques introduced in earlier courses. 3 cr, 3 lec, 1.5 lab. Prerequisites: CSCI 2050U, CSCI 3020U.

CSCI 3060U Software Engineering II: Software Quality Assurance. Building on previous software design courses, this course concentrates on the rigorous development of high quality software systems. Topics covered in this course include software process, software verification and validation (testing, inspection), software metrics, and software maintenance. A major team project is an important feature of this course. 3 cr, 3 lec, 1.5 lab. Prerequisites: CSCI 2020U, CSCI 3040U.

CSCI 3070U Analysis and Design of Algorithms. This course exposes students to the fundamental techniques for designing efficient computer algorithms, proving their correctness, and analyzing their complexity. It provides students with the expertise to analyze the cost of solving a specific problem with a given algorithm. Classical algorithms are analyzed in detail and their relative performance (depending on the ‘size’ of the problem) predicted. Generic efficient techniques such as recursion divide and conquer, “greedy” strategies and branch and bound are studied and their relative costs identified. Such a toolbox of effective techniques is necessary for the design and analysis of realistic algorithms to solve important problems in all application areas. 3 cr, 3 lec, 2 tut. Prerequisites: CSCI 2010U, CSCI 2110U. Credit restriction: ENGR 3770U.

CSCI 3090U Scientific Visualization and Computer Graphics. This course provides a basic introduction to computer graphics and scientific visualization. Basic properties of display devices, graphics objects, and common graphics operations will be identified. The use of colour, texture, lighting and surface/contour plots will be surveyed. Examples from modelling of PDEs will be presented. 3 cr, 3 lec, 1.5 lab. Prerequisites: CSCI 2010U, MATH 2072U. Credit restriction: ENGR 4860U.

CSCI 3150U Computer Networks. Network history and architectures; reference Model for Open Systems Interconnection (OSI): descriptions, examples, and applications; bridges, routers, gateways; routing, multicast deliver; TCP/IP protocol suite; transmission media (wired and wireless), network topologies (ring, bus, tree, star, mesh); local area networks, Ethernet, Token passing, wireless AN, personal LAN, WAN; communication network management; ATM and BISDN, the Internet: from services to security. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: CSCI 2050U. Credit restriction: ENGR 4650U.

CSCI 3210U Internet Based Media. This course is an introduction to the design and production of media to be delivered over the Internet. Topics to be covered in this course include web page design, active content, web-based applications, streaming media and mobile devices. Students will gain practical experience through the development of one or more Internet-based applications. 3 cr, 3. lec, 1.5 lab. Prerequisites: CSCI 1200U, CSCI 2160U.

CSCI 3220U Digital Media Production. This course examines the processes and techniques that are used in the production of various forms of digital media. Topics covered include budgeting, production planning, pre- and post-production, media collection and computer-based tools used in media capture and editing. Students in this course will be required to complete one or more media projects. 3 cr, 3 lec, 1.5 lab. Prerequisites: CSCI 2160U, CSCI 2200U.

CSCI 4020U Compilers. This course provides a detailed study of the compilation process for a procedural language. Students will develop an understanding of compiler design and put these principles into practice through the construction of a fully functioning compiler for a small procedural language using widely available tools for compiler construction and a general-purpose programming language. 3 cr, 3 lec, 1.5 lab. Prerequisite: CSCI 3020U. Credit restriction: ENGR 3960U.

CSCI 4040U Ethics, Law and the Social Impacts of Computing. This course is an examination of the impact that computing has on society and the impact that society has on computing. The development of laws and social mechanisms has not kept pace with the rapid development and deployment of computing and computing devices in our society. The ethics to deal with this situation exist but are not widely studied by students of computing. Current issues, developments and trends in computing ethics and law will be examined. The impact that computing has on society will be examined in light of the need for professional ethics and appropriate laws and regulatory agencies. 3 cr, 3 lec. Prerequisite: Final year of a Computing Science program.

CSCI 4100U Mobile Devices. This course is an introduction to developing applications for mobile devices including cell phones, PDAs, and mobile games. It covers the hardware architecture of mobile devices, wireless networks, communications protocols, software architecture, and application design and development. 3 cr, 3 lec, 3 lab. Prerequisite: CSCI 2020U.

CSCI 4110U Advanced Computer Graphics. This course covers more advanced topics in computer graphics including rendering algorithms, computer animation, programmable graphics displays, and graphical interaction. Students in the course will produce an animation or an interactive graphics application. 3 cr, 3 lec, 1.5 lab. Prerequisite: CSCI 3090U.

CSCI 4120U Digital Evidence. This is an introductory course in digital forensics, the gathering of evidence from computers that have been involved in a crime. This course covers the use of computers in the commission of crimes, basic evidence gathering techniques, examination of main memory and file systems, network analysis and mobile devices. 3 cr, 3 lec, 3 lab (biweekly). Prerequisites: CSCI 3020U, CSCI 3150U.

CSCI 4130U Forensic Informatics. This course examines the use of digital information in the examination and analysis of crime scene information and evidence. It covers image and sound analysis and enhancement, pattern recognition techniques, databases, and computer models of criminal activities. 3 cr, 3 lec, 3 lab (biweekly). Prerequisite: CSCI 3030U.

CSCI 4160U Interactive Media. This course is an introduction to interactive media including computer games, interactive stories, and educational software. 3 cr, 3 lec, 1.5 lab. Prerequisites: CSCI 2160U, CSCI 3090U.

CSCI 4410U Computing Science Thesis Project I. The thesis project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study and to satisfy specific objectives and requirements. The project may comprise an individual or group design project or an individual research project that has been approved by the supervising faculty member. Once all work has been completed, each student must submit a thesis and make a presentation based on their project in the following semester. 3 cr, 9 oth. Prerequisite: Clear standing in fourth year of the Computing Science program. Students must obtain prior consent of a faculty member. Note: Students are expected to take CSCI 4420U in the following semester.

CSCI 4420U Computing Science Thesis Project II. A continuation of the project started in CSCI 4410U. Students will make presentations and submit a written thesis based on their project. 3 cr, 9 oth. Prerequisite: CSCI 4410U. Note: Students are expected to take this course immediately following CSCI 4410U.

CSCI 4430U Directed Studies in Computing Science. This course requires independent research of a current topic in a specialized area of computing science. The topic will be selected from recent research literature and involve a review and critical appraisal of underlying theory and practice. The course comprises independent research, participation in weekly meetings, and written and oral presentations. 3 cr, 1 lec. Prerequisite: Students must have completed 90 credits in their Computing Science program and must be in clear standing. Students must also obtain prior consent of a faculty member.

CSCI 4610U Artificial Intelligence. This course introduces students to the fundamental concepts and techniques of artificial intelligence. Topics include: fundamental definitions and philosophical questions; search and constraint satisfaction; knowledge representation and reasoning; advanced search techniques; agents; machine learning and neural networks; AI planning systems. 3 cr, 3 lec. Prerequisites: STAT 2010U, CSCI 3070U.

CSCI 4620U Human-Computer Interaction. This course provides an introduction to human-computer interaction (HCI), with emphasis placed on understanding human behaviour with interactive objects, general knowledge of HCI design issues, and a human-centred approach to software design. The course will stress the design of usable interfaces, including the consideration of cognitive factors and social contexts within which computer systems are used. Students will receive an introduction to HCI while applying this theory to a design project. 3 cr, 3 lec, 2 tut. Prerequisite: CSCI 3040U. Credit restriction: ENGR 4850U.

CSCI 4630U High Performance Computing. This course allows the student to explore issues in high performance computing, specifically in the areas of parallel software design and programming. The major paradigms of parallel architectures and parallel complexity will be covered. Topics covered include: current trends in high performance computing (grid computing, etc.), parallel programming models, parallel programming with MPI, designing parallel systems, efficiency and debugging, performance analysis and profiling, parallel complexity theory, applications in scientific computing. 3 cr, 3 lec. Prerequisites: CSCI 3010U, CSCI 3020U, CSCI 3050U.

CSCI 4640U Distributed Computing. This course exposes the student to the major paradigms of distributed computing, from sockets to client/server to web services and grid computing. Topics covered include: distributed computing paradigms and models, distributed databases and storage issues, security (including encryption, certificates, attacks, authentication, authorization, digital signatures, firewalls, access control lists, capability access), Internet issues: name services, DNS, web services, grid computing; Globus, OGSA, project management in distributed computing, testing and performance, and design issues including in-depth coverage of techniques such as sockets, threads, Java RMI, Corba, Tomcat, servelets, and Globus. 3 cr, 3 lec, 2 tut. Prerequisites: CSCI 3020U, CSCI 3030U. Credit restriction: ENGR 4790U.

CSCI 4650U Elements of Theory of Computation. Provides and develops an understanding of which problems are inherently computable and which problems are tractable or feasible. Topics include: Church's thesis, recursively enumerable sets, Godel's incompleteness theorem and the relationships of these results to complexity results involving Turing machine models and P vs. NP hardness. 3 cr, 3 lec. Prerequisite: CSCI 3070U.

CURS 4000U I/S Core Curriculum Methods I. This course is an overview of approaches to teaching and learning in Grades 7-12 with specific emphasis on planning (year long, unit and lesson plans) and communication techniques (parent-teacher interviews, verbal and non-verbal communication) for all I/S BEd teacher candidates. The course includes an examination of related curriculum documents and supporting resources, as well as a review of current research and theory related to teaching and learning theory, as well as classroom practices. The emphasis will be on strategies that have broad applicability across curriculum areas. 2.25 cr, 3 lec. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4001U I/S Core Curriculum Methods II. This course will focus on issues in assessment and evaluation with an emphasis on the Ontario education system. A variety of assessment strategies will be explored along with examples of use, as well as construction of rubrics, portfolios, checklists, rating scales, quizzes etc. This course will cover evaluation concepts and methodologies, along with reporting techniques and issues. Lesson planning and designing learning experiences will also be part of this course. 1.5 cr, 2 lec. Prerequisite: CURS 4000U. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4100U Curriculum Studies I: I/S Biology. This course is a study of the general principles of lesson design and development to be used in the teaching of biology in the Intermediate and Senior divisions. Topics will include the content in science and biology courses taught in these divisions, relevant Ontario Ministry of Education guidelines, policies and resource documents, teaching philosophies, as well as instructional and assessment techniques (for both classroom and laboratory contexts) appropriate to the subject and level. 3 cr, 4 lec. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4101U Curriculum Studies II: I/S Biology. This course will expand upon the foundation provided in the Biology Curriculum Studies I course by continuing the examination of teaching methods and materials that are appropriate for the teaching of biology topics in Grades 11 and 12. Students will develop units of instruction and laboratory activities as well as learn a variety of assessment techniques for evaluating student progress. 3 cr, 4 lec. Prerequisite: CURS 4100U. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4110U Curriculum Studies I: I/S English. This course is a study of the general principles of curriculum design and development. Students will learn the forces that shape the curriculum and ways in which designers seek to address the needs of learners and society while being guided by the discipline of the subject. Particular attention will be given to the curriculum and teaching of English in the intermediate and senior divisions. Topics include: content in English courses taught in these divisions, relevant Ontario Ministry of Education guidelines, policies and resource documents, teaching philosophies, instructional and assessment techniques (for both classroom and laboratory contexts) appropriate to the subject and level. 3 cr, 4 lec. Note: Restricted to I/S Consecutive BEd students.

CURS 4111U Curriculum Studies II: I/S English. This course will expand upon the foundation provided in the English Curriculum Studies I course by extending the examination of teaching methods and materials that are appropriate for the teaching of English in the intermediate and senior divisions. Students will explore the development of lessons and units of instruction for particular topics in the Ontario English curriculum and will learn a variety of assessment techniques for use in evaluating student progress and for curriculum development. Special attention will be given to the integration of English with other areas of instruction. 3 cr, 4 lec. Prerequisite: CURS 4110U. Note: Restricted to I/S Consecutive BEd students.

CURS 4120U Curriculum Studies I: I/S Chemistry. This course is a study of the general principles of curriculum design and development. Students will learn about the forces that shape the curriculum and the ways in which teachers seek to address the needs of learners and other educational stakeholders. Particular attention will be given to the curriculum and teaching strategies for general science in the intermediate division and chemistry in the senior divisions. Topics include: analysis of curriculum documents and other Ministry of Education policy, lesson planning and an introduction to assessment and evaluation. 3 cr, 4 lec. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4121U Curriculum Studies II: I/S Chemistry. This course will expand upon the foundation provided in the Chemistry Curriculum Studies I course by extending the examination of teaching methods and materials that are appropriate for the teaching of chemistry in Grades 11 and 12. Students will explore the development of lessons and units of instruction for particular topics in the Ontario chemistry curriculum and will learn a variety of assessment techniques for use in evaluating student progress and for curriculum development. Lab safety, lab-based teaching and the use of technology in teaching lab skills will be foci of the course. 3 cr, 4 lec. Prerequisite: CURS 4120U. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4130U Curriculum Studies I: I/S Physics. This course is a study of the general principles of curriculum design and development. Students will learn about the forces that shape the curriculum and the ways in which teachers seek to address the needs of learners. Particular attention will be given to the curriculum and teaching strategies for general science at the intermediate division and physics in the senior divisions. Topics include: Ministry of Education policy, lesson planning and an introduction to assessment and evaluation. 3 cr, 4 lec. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4131U Curriculum Studies II: I/S Physics. This course will expand upon the foundation provided in the Physics Curriculum Studies I course by extending the examination of teaching methods and materials that are appropriate for the teaching of physics in Grades 11 and 12. Students will explore the development of lessons and units of instruction for particular topics in the Ontario physics curriculum and will learn a variety of assessment techniques for use in evaluating student progress and for curriculum development. Lab safety, lab-based teaching and the use of technology in teaching lab skills will be foci of the course. 3 cr, 4 lec. Prerequisite: CURS 4130U. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4140U Curriculum Studies I: I/S Mathematics. A study of the general principles of curriculum design and development. Students will learn the forces that shape the curriculum and ways in which designers seek to address the needs of learners and society while being guided by the discipline of the subject matter. Particular attention will be given to the curriculum and the teaching of mathematics in the intermediate and senior divisions. Topics will include: mathematics content in courses taught in these divisions, relevant Ontario Ministry of Education guidelines, policies and resource documents, teaching philosophies, instructional and assessment techniques appropriate to mathematics. 3 cr, 4 lec. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4141U Curriculum Studies II: I/S Mathematics. This course will expand upon the foundation provided in the Mathematics Curriculum Studies I course by extending the examination of teaching methods and materials that are appropriate for the teaching of mathematics in the intermediate and senior grades. Students will explore the development of lessons and units of instruction for particular topics in the Ontario mathematics curriculum and will learn a variety of assessment techniques for use in evaluating student progress and for curriculum development. Special attention will be given to the integration of mathematics with other areas of instruction. 3 cr, 4 lec. Prerequisite: CURS 4140U. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4150U Curriculum Studies I: I/S Visual Arts. This course includes principles of curriculum design and development and their implementation in a Visual Arts classroom. Students will learn the forces that shape the curriculum and ways in which designers seek to address the needs of learners and society while being guided by the discipline of the subject. Particular attention will be given to the curriculum and teaching of visual arts in the intermediate and senior divisions. Topics include: content in visual arts courses taught in these divisions, relevant Ontario Ministry of Education guidelines, policies and resource documents, teaching philosophies and instructional and techniques. 3 cr, 4 lec. Note: Restricted to I/S Consecutive BEd students.

CURS 4151U Curriculum Studies II: I/S Visual Arts. This course will expand upon the foundation provided in the Visual Arts Curriculum Studies I course by extending the examination of teaching methods and materials that are appropriate for the teaching of visual arts in the intermediate and senior grades. Students will explore the development of lessons and units of instruction for particular topics in the Ontario visual arts curriculum and will learn a variety of assessment techniques for use in evaluating student progress and for curriculum development. Special attention will be given to the integration of visual arts with other areas of instruction. 3 cr, 4 lec. Prerequisite: CURS 4150U. Note: Restricted to I/S Consecutive BEd students.

CURS 4160U Curriculum Studies I: I/S Computer Studies. A study of the general principles of curriculum design and development and their implementation in the Intermediate/Senior computer science classroom. Teacher candidates will learn the ways in which teachers seek to address the needs of learners and society while being guided by the discipline of the subject. Topics will include: the key concepts of courses in computer technology and informational science, relevant Ontario Ministry of Education guidelines, policies and resource documents and instructional techniques for classroom contexts appropriate to the subject. Teacher candidates will determine appropriate expectations and build lessons around them, make presentations to the class, and generate activities using Lego Mindstorms to enhance pedagogical creativity. 3 cr, 4 lec. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4161U Curriculum Studies II: I/S Computer Studies. A continued study of the general principles of curriculum design and development. This course will expand upon the foundation provided in the Computer Science Curriculum Studies I course by extending the examination of teaching methods and materials that are appropriate for the teaching of computer science and computer engineering in the high school environment. Assessment techniques will also be examined. Teacher candidates will further explore the development of lessons planning for particular topics in the Ontario curriculum, as well as devise whole units of study. Teacher candidates will make additional presentations to the class, create activities using electronics kits, and practice their assessment skills. 3 cr, 4 lec. Prerequisite: CURS 4160U. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

CURS 4181U Curriculum Studies II: I/S General Science. This course will expand upon the foundation provided in the General Science Curriculum Studies I course by extending the examination of teaching methods and materials that are appropriate for the teaching of general science in the intermediate and senior grades. Students will explore the development of lessons and units of instruction for particular topics in the Ontario science curriculum and will learn a variety of assessment techniques for use in evaluating student progress and for curriculum development. Special attention will be given to the integration of science with other areas of instruction. Current issues in general science teaching/learning, project-based teaching and the use of technology in teaching will be foci of the course. 3 cr, 4 lec. Prerequisite: CURS 4180U. Note: Restricted to I/S Consecutive BEd students.

CURS 4190U Curriculum Studies I: I/S Geography. This course introduces the fundamental concepts of three strands that are emphasized in the geography curricula of Ontario: geographical foundations of space and systems, human-environment interactions, and global connections. Constructivist teaching approaches will be modeled and then practiced by students as they examine the following content to be covered in this course: working with spatial measurements such as elevation, distance, area, direction, and scale, as well as with complex ideas such as place, region, distribution, and pattern; studying physical, economic, cultural and political systems; learning about the structure, evolution, and interaction of these systems; gaining insight into the interconnectedness of the physical and human worlds; analyzing the human consequences of natural events and the effects of human decisions on the environment; developing a global perspective by examining how the world's economies are becoming increasingly interconnected, and studying how the rate of movement of people, products, money, information, and ideas around the world is accelerating. Students who wish to gain an even deeper understanding in the use of GIS are encouraged to take the elective course, EDUC 3490U, in addition to this course. 3 cr, 4 lec. Note: Restricted to I/S Consecutive BEd students.

CURS 4191U Curriculum Studies II: I/S Geography. This course continues the work begun in CURS 4190U by familiarizing students with more of the content, theories, and practices that are currently advocated by the Ontario Ministry of Education for the teaching of geography in secondary schools. One of the strands to be considered in this course involves understanding and managing change. Teacher candidates will study how to teach the ways in which geographers use both local and global perspectives to identify trends, analyze the factors that cause change, and forecast the effects of change in the relationships between the earth's natural and human systems. In this course students will also learn how to teach the methods of geographic inquiry and communication. Geographers use a wide array of approaches and tools in their work. Some of these, such as fieldwork and computer analysis, are used in various disciplines; others are more specific to geographic studies. The latter include mapping, interpretation of aerial photographs, remote sensing, and image analysis using the global positioning system (GPS) and geographic information systems (GIS). Students who wish to gain an even deeper understanding in the use of GIS are encouraged to take the elective course, EDUC 3490U, in addition to this course. 3 cr, 4 lec. Prerequisite: CURS 4190U. Note: Restricted to I/S Consecutive BEd students.

CURS 4200U P/J Core Curriculum Methods. This course provides teacher candidates with an overview of approaches to teaching and learning in Grades JK to 6. Planning (long range, unit and lesson) and communication skills will be emphasized. The course will include an examination of related curriculum documents and supporting resources, as well as a review of current research and theory related to teaching strategies and classroom practices. The emphasis will be on methods and approaches that have broad applicability across curriculum areas. 1.5 cr, 2 lec. Note: Restricted to P/J Consecutive BEd students.

CURS 4210U P/J Language Arts. This course provides teacher candidates with an overview of teaching and learning English language arts (speaking, listening, reading, writing, viewing, and representing) from JK to Grade 6, as well as drama (from the Arts curriculum). The curriculum content will include a review of related curriculum documents and supporting resources as well as a review of current subject-related theory, teaching and assessment strategies, and classroom practices. 3 cr, 4 lec. Note: Restricted to P/J Consecutive BEd students.

CURS 4211U P/J Teaching Language Arts. This course provides teacher candidates with an extended study of teaching and learning the English language arts (speaking, listening, reading, writing, viewing, and representing) from JK to Grade 6, as well as drama (from the Arts curriculum). An emphasis will be placed on planning (long-range) and unit planning across subjects, integrating Language Arts. The curriculum content will include a review of related curriculum documents and supporting resources as well as a review of current theories of learning, teaching, assessment, evaluation and classroom strategies and practices). 3 cr, 4 lec. Note: Restricted to P/J Consecutive BEd students. Prerequisites: CURS 4200U, CURS 4210U.

CURS 4240U P/J Mathematics I. This course provides teacher candidates with an overview of the teaching and learning of mathematics, Grades JK to 6. The curriculum content will include a review of related curriculum documents and supporting resources, as well as a review of current subject related theory, teaching and assessment strategies, and classroom practices. 1.5 cr, 2 lec. Note: Restricted to P/J Consecutive BEd students.

CURS 4241U P/J Mathematics II. This course provides teacher candidates with an extended study of the teaching and learning of mathematics, Grades JK to 6. The curriculum content will include a review of related curriculum documents and supporting resources as well as a review of current subject related theory, teaching and assessment strategies, and classroom practices. 1.5 cr, 2 lec. Prerequisite: CURS 4240U. Note: Restricted to P/J Consecutive BEd students.

CURS 4251U P/J Visual Arts, Music and Dance. The arts are an integral part of a student's education and education in the arts is essential to a student's intellectual, social, physical and emotional development. This course provides teacher candidates with an extended study of teaching and learning visual arts, music and dance in Grades K – 6, with a focus on developing an understanding and appreciation of the creative process in an integrated and learner-centred classroom. The curriculum content will include a review of related curriculum documents and supporting resources as well as a review of current subject-related theory, teaching strategies, and classroom practices. 3 cr, 4 lec. Note: Restricted to P/J Consecutive BEd students.

CURS 4271U P/J Social Studies. Social studies may be defined as the historical, social, cultural, economic, political, and environmental aspects of societies past, present and future. This course provides teacher candidates with an overview of teaching and learning in social studies, history and geography from Grades JK to 6. Social studies is divided into two strands: Heritage and Citizenship plus Canada and World Connections. The curriculum content will include a review of related curriculum documents and supporting resources as well as a review of current subject-related theory, teaching strategies and classroom practices. 1.5 cr, 2 lec. Note: Restricted to P/J Consecutive BEd students.

CURS 4280U P/J Science and Technology I. This course is intended to provide teacher candidates with an overview of teaching and learning Science and technology from JK to Grade 6. Candidates will be provided with the knowledge and scientific processes needed to develop a thorough understanding of the science concepts. This course will be presented in a manner which models a discovery approach and includes the knowledge and skills necessary to design an inquiry-oriented, activity-based, hands-on interactive program. The curriculum content will include a review of related curriculum documents and supporting resources as well as a review of current subject-related theory, teaching strategies, and classroom practices. 1.5 cr, 2 lec. Note: Restricted to P/J Consecutive BEd students.

CURS 4281U P/J Science and Technology II. This course is intended to provide teacher candidates with an extended study of teaching and learning science and technology from JK to Grade 6. Candidates will be provided with the knowledge and scientific processes needed to develop a thorough understanding of the science concepts. This course will be presented in a manner which models a discovery approach and includes the knowledge and skills necessary to design an inquiry-oriented, activity-based, hands-on interactive program. The curriculum content will include a review of related curriculum documents and supporting resources as well as a review of current subject-related theory, teaching strategies, and classroom practices. 1.5 cr, 2 lec. Prerequisite: CURS 4280U. Note: Restricted to P/J Consecutive BEd students.

CURS 4291U P/J Health and Physical Education. This course provides teacher candidates with an overview of teaching fundamental movement skills, active participation and healthy living, the three strands in the health and physical education curriculum. The curriculum content will include a review of related curriculum documents and supporting resources, as well as links to other subjects and the application of the skills to life experiences. 1.5 cr, 2 lec. Note: Restricted to P/J Consecutive BEd students.

CURS 4501U Curriculum Studies I: I/S History. Based on the Ontario Curriculum's Canadian and World Studies document, this course is developed around the ideals of historical literacy and thinking. Teacher candidates will consider course design, assessment, and teaching methods based on the principles of: historical significance, cause and consequence, continuity and change, evidence and interpretation, historical perspective-taking and moral judgment. Throughout this course teacher candidates will develop their pedagogical and technological skills as they learn to teach history in the digital age. 3 cr, 4 lec. Note: Restricted to I/S Consecutive students.

CURS 4502U Curriculum Studies II: I/S History. This course will expand upon the foundation provided in the History Curriculum Studies I course by extending the examination of teaching methods and materials that are appropriate for the teaching of History in grades 11 and 12. Students will explore the development of lessons and units of instruction for particular topics in the Ontario History curriculum and learn a variety of assessment techniques for use in evaluating student progress and for teaching curriculum development. 3 cr, 4 lec. Prerequisite: CURS 4501U. Note: Restricted to I/S Consecutive students.

CURS 4503U Curriculum Studies I: I/S Health and Physical Education. This course will explore health and physical education content, philosophies and teaching methodologies from Grade 7 to 12. Students will be shown how to infuse multimedia technologies into the delivery of the curriculum. They will be encouraged to explore Physical Education and Health topics by taking part in projects, presentations and practical labs. Many of the health topics in the Ontario Health Curriculum such as the compulsory CPR unit will be presented and discussed. In addition, many of the current issues that are related to health and wellness will be studied in the course. The physical education portion of the course includes activity sessions in dance, outdoor recreation, leisure time sports activities and many individual and team sports. This course will include methods of assessment and evaluation of students and programs, curriculum development and the practice of maintaining a balanced program of curricular, interschool and intramural activities. 3 cr, 4 lec. Note: Restricted to I/S Consecutive students.

CURS 4504U Curriculum Studies II: I/S Health and Physical Education. This course will expand upon the foundation provided in the Health and Physical Education Curriculum Studies I course by extending the examination of teaching methods and materials that are appropriate for the teaching of Health and Physical Education in grades 11 and 12. Students will explore the development of lessons and units of instruction for particular topics in the Ontario health and physical education curriculum and learn a variety of assessment techniques for use in evaluating student progress and for teaching curriculum development. This course will focus on the development of fitness. Activity sessions will demonstrate lesson sequences, class organization, use of materials and safety considerations (OPHEA Guidelines), while they will also incorporate a variety of teaching styles. 3 cr, 4 lec. Prerequisite: CURS 4503U. Note: Restricted to I/S Consecutive students.

ECON 2010U Microeconomics. As a first course in economics, microeconomics introduces the student to principles such as scarcity, opportunity cost, diminishing returns, elasticity, industrial organization, economies to scale, and concentration. The course begins with an introduction to the market and price determination. The course reviews the cost structure of the firm in both the long and short run. Price and quantity decisions for firms in various competitive situations are discussed. Canada's Competition Act is examined. The course also analyzes the markets for factors of production. 3 cr, 2 lec, 1.5 tut. Credit restriction: BUSI 2050U.

ECON 2020U Macroeconomics. As an introductory course in economics, macroeconomics introduces the student to principles such as unemployment, inflation, economic growth, the multiplier, equilibrium, fiscal policy, and monetary policy. The student builds on the knowledge of the market from microeconomics and proceeds to an understanding of aggregate demand and supply. The principle of money and banking are introduced along with the role of the Bank of Canada. The course also introduces the student to the principles of international trade theory. 3 cr, 2 lec, 1.5 tut. Credit restriction: BUSI 2050U.

EDUC 2900U I/S Concurrent Introduction to Teaching and Field Experience I. In this first course in education, concurrent science/education students will be introduced to the profession of teaching through the Standards of Teaching and Ethical Standards as set out by the Ontario College of Teachers. They will begin their development as professionals through ample practice in reflection and the initial development of a professional portfolio. They will study, reflect and communicate their understanding of how school cultures and learner diversity affect learning and then shape teacher practices through observation, case studies and other instructional material. This course includes a two-week field experience in an elementary school at the end of the academic year. In preparation for this field study, students will be introduced to the Ontario Curriculum Policy documents. They will be initiated in the key elements of teacher practice: lesson plans, diversity of learners, classroom management and communication as professionals. They will collaborate with each other through the establishment of an online learning community as they discuss issues and assignments that arise from class and as they as they go out in the field in their practicum, they will share curriculum resources and the use of technology that will serve to integrate curriculum expectations with teaching practice. Weekly class hours: 2 hours + 2-week (10 days) field experience at the end of the academic year. 3 cr, 2 lec + 1 oth (online). Restricted to I/S Concurrent BSc (Hons)/BEd students.

EDUC 2901U I/S Concurrent Field Experience II. The second field study is designed to provide concurrent science/education students with a three-week field experience in secondary schools at the end of their second academic year. This will help them to develop an understanding of and appreciation for the school culture and the professional community of which they will be a part. Under the guidance of professional associate teachers in the field and faculty advisors, teacher candidates will engage in guided observations and interactions with students. Weekly class hours: 2 hours + three-week (15 days) field experience at the end of the academic year. 3 cr, 2 lec + 1 oth (online). Prerequisite: EDUC 2900U. Restricted to I/S Concurrent BSc (Hons)/BEd students.

EDUC 3430U Dramatic Arts. Students who take this course will learn how to use a variety of creative and scripted drama strategies in their teaching of other subjects. Techniques such as warm-ups, tableaux, mime, puppetry, improvisations, story-telling, readers' theatre, digital video production, and other aspects of drama pedagogy will be covered. No prior knowledge or experience in drama is required. Those who have studied drama or theatre arts in school or university will still find that this course has much to offer in terms of how to use drama in order to enhance learning in different subject disciplines. 1.5 cr, 2 lec. Note: Students taking I/S Drama teachable course CURS 4170U and CURS 4171U are not allowed to take this course. Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher.

EDUC 3440U Teaching of Students of English as a Second Language. Whether students are interested in teaching English internationally, or they wish to improve their ability to meet the needs of second language learners in their Canadian classrooms, this course aims to provide them with many strategies to improve their teaching of reading, writing, speaking and listening in the ESL classroom. Socio-linguistic theories and approaches such as task-based learning and communicative language learning will form the foundations for classroom activities involving the use of English language learning software. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher.

EDUC 3441U L'apprentissage en français. This course is designed for teacher candidates who are aspiring to teach French as a Second Language at a future point in their careers. The course is designed to approach the learning of a second language through an integrated approach for the key skills of listening, speaking, reading, writing and appreciation of French culture. The focus will be on how students acquire second language proficiency in both Core French and French Immersion settings in the Ontario school system. A significant portion of class content will be in French. 1.5 cr, 2 lec. Prerequisite: Working facility in the French language. A French language proficiency test may be required. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 3450U Teaching Kindergarten. This course provides teacher candidates with an overview of teaching and learning at the kindergarten level. The content will include a review of related curriculum documents and supporting resources, as well as a review of current theory, teaching strategies and classroom practices at the kindergarten level. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher.

EDUC 3452U Teacher as Coach. This course is intended to encourage teacher candidates to become involved in the life of the school outside of the classroom, whether through sports or other leadership opportunities. As a requirement of this elective, teacher candidates must complete a minimum of six hours as a volunteer/coach in one of their field placement schools. During the classroom component, teacher candidates will develop an understanding of the variety of co-curricular activities and the responsibilities associated with coaching/leadership. To develop a better appreciation of the complexities of organizing student activities, candidates will also have the opportunity to tour and survey the facilities within a secondary school. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher.

EDUC 3455U Mental Health Issues in Schools. This course will focus on the growing concern of mental health issues for students in the education system. Teacher candidates will learn various mental health problems such as depression, anxiety, body image disorders, ADD/ADHD, conduct disorders, trauma/abuse, PTSD, substance abuse, gambling addictions and attachment issues. They will learn how mental health problems are dealt with in schools and the roles and responsibilities of various agencies such as teachers, police, mental health workers and support personnel. Students will explore teaching strategies and accommodations that work with various mental health problems as well as current programs, intervention strategies and risk and threat assessment procedures. The overall objective is to build resiliency in students and offer universal support in the education system. Teacher candidates will become familiar with Canadian practices and processes of identification in the classroom to the final step of treatment and educational support. The course will be offered as 2, two-hour classes and one weekend (Saturday/Sunday) class. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher.

EDUC 3460U Problem Based Learning. The course introduces an approach to teaching that focuses on the value of learning from real and meaningful activities. Candidates will learn to find and structure activities around the kind of "ill-defined" problems that face professionals in their work and they will learn to use these activities as the basis for promoting self-directed inquiry. 1.5 cr, 2 lec. Restricted to BEd students. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in years three, four or five with a GPA of 2.7 or higher.

EDUC 3470U Issues in Education. This elective explores current issues in educational practice and policy in the context of their social foundations. By examining research literature and current data, teacher candidates will analyze contemporary and, at times, controversial topics and their impact on education. While the course will stress Ontario issues, one purpose will be to help the students to understand these issues in the context of related questions. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher.

EDUC 3480U Outdoor Education: Canoe Tripping. This adventure-based course will offer a specific focus on canoe tripping and tenting in the fall. Activities will include setting up camp, sleeping in tents, cooking over single-burner stoves and canoe tripping and portaging. The course will include 2 classes of 4 hours, 1 evening at a pool and 1 Saturday of canoe training and one full weekend of canoe tripping (Friday to Sunday). Teacher candidates will concentrate on ways to develop their own leadership and facilitation skills in settings that allow them to offer dynamic experiential curricula. This course will help teacher candidates design and implement curriculum to enhance student learning and development beyond the walls of the traditional classroom. Each course will offer a specific focus including canoe tripping and backpacking in the fall and tenting, snow shelter and cabin living in the winter. 1.5 credit. Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher. A supplemental course fee will apply.

EDUC 3481U Outdoor Education: Backpacking. This adventure-based course will offer a specific focus on backpacking and tenting in the late fall. Activities will include carrying packs of gear, navigating in the backcountry, setting up camp and cooking over single-burner stoves. The course will include 2 classes of 4 hours and one full weekend (Friday to Sunday) taking part in a backpacking and tenting activity. In addition, there will be an excursion to a centre with a Canadian historical and pedagogical focus. Teacher candidates will concentrate on ways to develop their own leadership and facilitation skills in settings that allow them to offer dynamic experiential curricula beyond the walls of the traditional classroom. Note: 1.5 credit. Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher. A supplemental course fee will apply.

EDUC 3482U Outdoor Education: Winter Survival with Cross Country Skiing. This adventure-based, residential camp course will offer a specific focus on winter survival. Activities will include shelter building, fire lighting, cooking over a fire and cross country skiing in the backcountry. Also, camp-based activities will include low and high ropes and orienteering by map and geocaching with GPS. This course will include 2 classes of 4 hours and one full weekend (Friday to Sunday) taking part in winter activities situated at a residential camp. In addition, there will be an excursion to a centre with an ecological and pedagogical focus. Teacher candidates will concentrate on ways to develop their own leadership and facilitation skills in settings that allow them to offer dynamic experiential curricula beyond the walls of the traditional classroom. Note: 1.5 credit. Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher. A supplemental course fee will apply.

EDUC 3483U Outdoor Education: Bush Snowshoeing and Tenting. This adventure-based course will offer a specific focus on winter camping and snowshoeing. Activities will include snowshoe trekking into the backcountry, setting up and sleeping in tents, cooking over single-burner stoves plus the option of pond skating. This course will include 2 classes of 4 hours and one full weekend (Friday to Sunday) taking part in a winter activities. In addition, there will be an excursion to a centre with an ecological and pedagogical focus. Teacher candidates will concentrate on ways to develop their own leadership and facilitation skills in settings that allow them to offer dynamic experiential curricula beyond the walls of the traditional classroom. Note: 1.5 credit.

Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher. A supplemental course fee will apply.

EDUC 3490U Geographic Information Systems. This course will focus on giving teacher candidates exposure and experience with geographic information systems (GIS) using Arc View and global positioning systems (GPS). Most beneficial to all teacher candidates with geography as a teachable, this course will also be applicable and related for those with science or math as a teachable subject. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 3510U P/J Learning with ICT. Teaching and learning with technology depends on an understanding of the tools and resources available to teachers to enhance the learning environment. The emphasis of the course is to provide an understanding of the efficacy of the technology and practical exercises in using the technology. Included in this course: SMART Boards, setup and operating; SMART Board tools, using Notebook, and SMART Tools to create lessons and to present digital information; Digital projectors, setup and operating; Photostory, a simple to use multimedia presentation tool; PowerPoint in the classroom, more features to develop effective lessons and presentations; CPS, clicker systems for interactive classroom engagement; Adobe Photoshop Elements, creating and enhancing digital images; MS Excel, using spreadsheets in the classroom; Windows Movie Maker. 1.5 cr, 2 lec. Note: Restricted to P/J Consecutive BEd students.

EDUC 3511U I/S Learning with ICT. Teaching and learning with technology depends on an understanding of the tools and resources available to teachers to enhance the learning environment. The emphasis of the course is to provide an understanding of the efficacy of the technology and practical exercises in using the technology. Included in this course: SMART Boards, setup and operating; SMART Board tools, using Notebook, and SMART Tools to create lessons and to present digital information; Digital projectors, setup and operating; Photostory, a simple to use multimedia presentation tool; PowerPoint in the classroom, more features to develop effective lessons and presentations; CPS, clicker systems for interactive classroom engagement; Adobe Photoshop Elements, creating and enhancing digital images; MS Excel, using spreadsheets in the classroom; Windows Movie Maker. 1.5 cr, 2 lec. Note: Restricted to I/S Consecutive BEd students and I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 3560U Religious Education: Teaching in Ontario Catholic Schools. This course, which is compulsory for teacher candidates who want to teach in Ontario Catholic Schools, is designed to enhance the professional knowledge, understanding and skills of those teacher candidates. They will study ways in which curriculum can be designed to reflect the philosophy and values of the Catholic system and examine the relation between educational principles and everyday classroom practices. 2.25 cr, 3 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year three, four or five with a GPA of 2.7 or higher.

EDUC 3610U P/J Contemporary Educational Practice. The course introduces teacher candidates to the basic legal issues related to teaching in the publicly- funded school systems in Ontario. Teachers must be aware of their rights and obligations as defined in legislation. They must also understand how education is delivered to pupils in Ontario and the basic structure supporting that delivery. These rights and obligations, combined with the legal structure and processes, have a direct impact on the relationships between teachers and pupils, teachers and their colleagues in education, and teachers and the community. The course addresses Ontario education law, related legislation (acts and regulations) and policy including the Constitution Acts (1867 and 1982), the Education Act, The Ontario College of Teachers Act, the Teaching Profession Act, the Labour Relations Act, the Trespass to Property Act, the Municipal Freedom of Information and Protection of Privacy Act, and the legislation regarding workplace health and safety. 3 cr, 4 lec. Note: Restricted to P/J consecutive BEd students.

EDUC 3611U I/S Contemporary Educational Practice. The course introduces teacher candidates to the basic legal issues related to teaching in the publicly funded school systems in Ontario. Teachers must be aware of their rights and obligations as defined in legislation. They must also understand how education is delivered to pupils in Ontario and the basic structure supporting that delivery. These rights and obligations, combined with the legal structure and processes, have a direct impact on the relationships between teachers and pupils, teachers and their colleagues in education, and teachers and the community. The course addresses Ontario education law, related legislation (acts and regulations) and policy including the Constitution Acts (1867 and 1982), the Education Act, The Ontario College of Teachers Act, the Teaching Profession Act, the Labour Relations Act, the Trespass to Property Act, the Municipal Freedom of Information and Protection of Privacy Act, and the legislation regarding workplace health and safety. 3 cr, 4 lec. Note: Restricted to I/S Consecutive BEd students.

EDUC 3612U I/S Concurrent Contemporary Educational Practice. This course introduces teacher candidates to the basic legal issues related to teaching in the publicly-funded school systems in Ontario. Teachers must be aware of their rights and obligations as defined in legislation. They must also understand how education is delivered to pupils in Ontario and the basic structure supporting that delivery. These rights and obligations, combined with the legal structure and processes, have a direct impact on the relationships between teachers and pupils, teachers and their colleagues in education, and teachers and the community. The course addresses Ontario education law, related legislation (acts and regulations) and policy including the Constitution Acts (1867 and 1982), the Education Act, The Ontario College of Teachers Act, the Teaching Profession Act, the Labour Relations Act, the Trespass to Property Act, the Municipal Freedom of Information and Protection of Privacy Act, and the legislation regarding workplace health and safety. 3 cr, 4 lec. Note: Restricted to I/S Concurrent BSc (Hons)/BEd students.

EDUC 3750U P/J Learning and Child Development. This course is designed to provide an opportunity for teacher candidates to explore key theories and issues in human development and learning. The course will primarily focus on child development and learning specific to primary and junior grade teaching. Subjects to be covered are cognitive, social, personality and learning development. teacher candidates will be introduced to the major psychological theories, theorists and controversies in the field of child development. Teaching methods will include lectures, and experiential learning including group work, case studies, videos and observations. 3 cr, 4 lec. Note: Restricted to P/J Consecutive BEd students.

EDUC 3751U I/S Learning and Adolescent Development (formerly I/S Learning and Human Development). This course is designed to provide an opportunity to teacher candidates to explore key theories and issues in human development and learning. The course will primarily focus on adolescent development and learning specific to intermediate and senior teaching. Subjects to be covered are cognitive, social, personality and learning development. Students will be introduced to the major psychological theories, theorists and controversies in the field of adolescent development. The latest research relating to adolescent development will be explored in relation to classroom performance and curriculum development. Teaching methods will be experiential in nature including group work, case studies, and videos. 3 cr, 4 lec. Note: Restricted to I/S/Consecutive BEd students.

EDUC 3752U I/S Concurrent Learning and Adolescent Development. This course is designed to provide an opportunity to teacher candidates to explore key theories and issues in human development and learning. The course will primarily focus on adolescent development and learning specific to intermediate and senior teaching. Subjects to be covered are cognitive, social, personality and learning development. Students will be introduced to the major psychological theories, theorists and controversies in the field of adolescent development. The latest research relating to adolescent development will be explored in relation to classroom performance and curriculum development. Teaching methods will be experiential in nature including group work, case studies, and videos. 3 cr, 4 lec. Note: Restricted to I/S Concurrent BSc (Hons)/BEd students.

EDUC 3800U P/J Individual Needs and Diversity. This course focuses on strategies to address special needs of students within the regular classroom. It introduces different types of special needs encountered in the elementary schools and examines the instructional and assessment strategies most likely to succeed with these learners. The course includes review of legislation and required procedures such as Individual Education Plans (IEPs) and Identification, Placement and Review Committees (IPRC). Techniques for modifying testing situations and course materials are also addressed. Students are encouraged to see effective partnerships with parents and other professionals as essential to effective learning and integration. Another focus in the course is the increasing diversity of the regular classroom-gender and racial differences, ESL, patterns of family life, religious beliefs, socioeconomic status, etc. Students will explore ways to address such differences so that they are accepted and respected. 1.5 cr, 2 lec. Note: Restricted to P/J Consecutive BEd students.

EDUC 3801U I/S Individual Needs and Diversity. This course focuses on strategies to address special needs of students within the regular classroom. It introduces different types of special needs encountered in the elementary and secondary schools and examines the instructional and assessment strategies most likely to succeed with these learners. The course includes review of legislation and required procedures such as Individual Education Plans (IEPs) and Identification, Placement and Review Committees (IPRC). Techniques for modifying testing situations and course materials are also addressed. Students are encouraged to see effective partnerships with parents and other professionals as essential to effective learning and integration. Another focus in the course is the increasing diversity of the regular classroom including gender and racial differences, ESL, patterns of family life, religious beliefs, socioeconomic status, etc. Students will explore ways to address such differences so that they are accepted and respected. 1.5 cr, 2 lec. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 3911U I/S Information Literacy. This course concentrates on developing the cognitive skills needed to identify, locate, evaluate and use information to problem solve in teaching and learning. Instructional strategies which build literacy in the realms of media, technology, imagery and traditional text will be explored with respect to the inquiry and research process. We will examine Ministry and Board level documents to determine grade level expectations for gathering, analyzing and synthesizing information, and consider the special needs of students at risk (i.e. English language learners) in these processes. 1.5 cr, 2 lec. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/ BEd students in year five.

EDUC 4240U Action Research and Reflection (formerly Understanding Educational Research, Theory and Practice). This course is designed to introduce teacher candidates to the diverse approaches to knowledge production that make up educational research from an action research perspective. The course assists teacher candidates to begin the process of using educational research and reflective practice to construct, document and inform their own professional practice. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 4380U P/J Analysis and Management of Classroom Behaviour. This course provides teacher candidates a realistic overview of the variables that are operative in classrooms and provides strategies for optimizing the learning environment. Approaches to dealing with student misbehaviour will be addressed in a variety of ways including case studies, role-playing and guest speakers. A wide range of behavioural, emotional and academic problems will be discussed in the context of important dimensions such as teacher age and experience, other teacher characteristics, age of students, subject matter and type of class (e.g. regular classroom vs. lab). Students will be expected to develop a personalized approach to effective classroom management that builds on the issues identified in the course, field experience and research. 1.5 cr, 2 lec. Note: Restricted to P/J Consecutive BEd students.

EDUC 4381U I/S Analysis and Management of Classroom Behaviour I. This course provides teacher candidates a realistic overview of the variables that are operative in classrooms and provides strategies for optimizing the learning environment. Approaches to dealing with student misbehaviour will be addressed in a variety of ways including case studies, role-playing and guest speakers. A wide range of behavioural, emotional and academic problems will be discussed in the context of important dimensions such as teacher age and experience, other teacher characteristics, age of students, subject matter and type of class (e.g. regular classroom vs. lab). Students will be expected to develop a personalized approach to effective classroom management that builds on the issues identified in the course, field experience and research. 1.5 cr, 2 lec. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 4382U I/S Analysis and Management of Classroom Behaviour II. This course is a continuation of EDUC 4381U and focuses on classroom management in the secondary school setting. This course will look at the experiences that the I/S students had during their second placement. 1.5 cr, 2 lec. Prerequisite: EDUC 4381U. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 4611U Planning for Learning with Technology. This course provides teacher candidates with the opportunity to develop a comprehensive plan for the incorporation of technology into the teaching of a unit of study. Teacher candidates, in consultation with faculty staff, will select a unit of study relevant to their specialization/grade of choice. Following an introduction to Instructional Design concepts, students will select a suite of technology tools appropriate for the unit of study. These tools, and the manner in which they are utilized, should reflect real classroom/school/Board environments. Teacher candidates will also be expected to incorporate a professional development component in their unit and to conduct a mini-training/PD lesson. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five. Corequisite: EDUC 3510U or 3511U.

EDUC 4612U Technology for Teachers. This course will provide teacher candidates with an overview of the tools and basic skills essential for teachers. The program includes: an introduction to Windows with an emphasis on a practical guide to file storage, retrieval and backup; MS OneNote, a key tool for note taking, research and project development; Word, extending the basics of Word with templates and features to help teacher candidates work more productively; PowerPoint an introduction, and related presentation tools; Internet Explorer and Google toolbar; Web resources and tools for communications and productivity. This course will also offer mini-lessons in Technology, which are a series of (1 hour/1.5 hour) lessons to address specific needs of teacher candidates. The content of these lessons will be based on a combination of requests from teacher candidates and emerging patterns of needs as observed by TCs and faculty. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 4620U Teaching Extended Mathematics. Student success in mathematics is related to teacher understanding and comfort with the subject. This course has been designed for teacher candidates that are comfortable with mathematics and are interested in extending their understanding of teaching and learning mathematics. 1.5 cr, 2 lec. Note: Restricted to P/J or I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 4622U Mathematics for Teachers. Successful student learning in mathematics depends on teacher understanding and comfort with mathematics. This course has been designed to provide additional support for P/J teacher candidates as they reconstruct their mathematical content knowledge and develop their confidence with mathematics. The focus will be on exploring mathematics in new ways, with an emphasis on hands-on explorations, problem solving and communicating mathematically. 1.5 cr, 2 lec. Note: Restricted to P/J Consecutive BEd students.

EDUC 4700U Models of Teaching. This course provides students with an overview of approaches to learning and teaching in various educational contexts. It is designed to provide students with an opportunity to explore key theories and principles in learning. Students will be introduced to behavioural, cognitive and humanistic principles of learning. Students will explore issues such as qualities of good teachers, setting objectives, and teaching strategies all within numerous contexts. 3 cr, 3 web. Note: This course is not open to students enrolled in the P/J or I/S Consecutive BEd program or I/S concurrent BSc (Hons)/BEd program.

EDUC 4701U Teaching and Learning: Instructional Design and Technology in Adult Learning. This course is an examination of traditional instructional design principles (the ADDIE model), contemporary offshoots and new directions (like "constructivist design") especially as they bear on learning and the teaching of diverse populations. Particular attention will be paid to the different roles technology may play in differing instructional designs. 3 cr, 3 web. Note: This course is not open to students enrolled in the P/J or I/S Consecutive BEd program or I/S concurrent BSc (Hons)/BEd program.

EDUC 4702U Teaching and Learning: Evaluation and Assessment. This course addresses theory, research and practice related to the evaluation and assessment of achievements related to learning objectives. Approaches to both summative and formative evaluation will be considered and there will be a particular focus on assessment in adult learning contexts. Traditional testing practices will be studied as a basis for an examination of authentic, performance, and portfolio assessment strategies. 3 cr, 3 web. Note: This course is not open to students enrolled in the P/J or I/S Consecutive BEd program or I/S concurrent BSc (Hons)/BEd program.

EDUC 4703U Teaching and Learning: Problem Based Learning. This course introduces an approach to teaching that focuses on the value of learning from real and meaningful activities. Candidates will learn to find and structure activities around the kind of "ill-defined" problem that faces professionals in their work and they will learn to use these activities as the basis for promoting self directed inquiry. 3 cr, 3 web. Note: This course is not open to students enrolled in the P/J or I/S Consecutive BEd program or I/S concurrent BSc (Hons)/BEd program.

EDUC 4704U Teaching and Learning: Curriculum Design. This course will build on previous educational courses and introduce students to curriculum design. Students will work on an educational project in designing a curriculum based on a realistic learning situation in their profession. 3 cr, 3 web. Note: This course is available to all undergraduate students with the exception of those enrolled in the P/J or I/S Consecutive BEd program or I/S concurrent BSc (Hons)/BEd program.

EDUC 4900U I/S Field Experience and Practica I. Placements in schools are designed to provide teacher candidates with opportunities to grow as successful teachers and learners under the guidance of professional associate teachers in the field and faculty advisors. This involves observation periods, practice teaching opportunities and field experience class to prepare teacher candidates for these field experiences. This course also involves special presentations and speakers related to the teaching profession. 1.5 cr, 3 sessions + practica. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five.

EDUC 4901U I/S Field Experience and Practica II. Placements in schools are designed to provide teacher candidates with opportunities for growth as successful teachers and learners under the guidance of professional associate teachers in the field and faculty advisors. This involves observation periods, practice teaching opportunities and field experience classes to prepare teacher candidates for these field experiences. This course also involves special presentations and speakers related to the teaching profession. 1.5 cr, 3 sessions + practica. Note: Restricted to I/S Consecutive BEd students or I/S Concurrent BSc (Hons)/BEd students in year five. Prerequisite: EDUC 4900U.

EDUC 4902U I/S Concurrent Field Experience III. This third field experience for Concurrent Science/Education students, involves observation periods, practice teaching opportunities and a weekly field experience class to prepare teacher candidates for these field experiences. Placements in schools are designed to provide teacher candidates with opportunities for growth as successful teachers and learners under the guidance of professional associate teachers in the field and faculty advisors. Weekly class hours: 2 hrs. + four-week (20 days) field experience at the end of the academic year. 3 cr, 2 lec. Prerequisite: EDUC 2901U. Note: Restricted to I/S Concurrent BSc Hons)/BEd students.

EDUC 4910U P/J Field Experience and Practica I. Placements in schools are designed to provide teacher candidates with opportunities for growth as successful teachers and learners under the guidance of professional associate teachers in the field and faculty advisors. This involves observation periods, practice teaching opportunities and weekly field experience classes to prepare teacher candidates for these field experiences. This course also involves special presentations and speakers related to the teaching profession. 1.5 cr, 3 sessions + practica. Note: Restricted to P/J Consecutive BEd students.

EDUC 4911U P/J Field Experience and Practica II. Placements in schools are designed to provide teacher candidates with opportunities for growth as successful teachers and learners under the guidance of professional associate teachers in the field and faculty advisors. This involves observation periods, practice teaching opportunities and field experience classes to prepare teacher candidates for these field experiences. This course also involves special presentations and speakers related to the teaching profession. 1.5 cr, 3 sessions + practica. Prerequisite: EDUC 4910U. Note: Restricted to P/J Consecutive BEd students.

ENGR 0101U Mathematics Foundation for Engineers. Rates of change, tangent and velocity problems, differentiation, chain rule, higher order derivatives, logarithmic differentiation, related rates, linear approximation, curve sketching; definite integral, area, integration by parts, double and triple integrals, trigonometric integration, partial fractions; numerical integration, separable differential equations, polar coordinates; series; tests for divergence/convergence; partial derivatives, gradient vector. 3 cr, 6 lec, 3 tut. Credit restrictions: MATH 1010U, MATH 1020U.

ENGR 0102U Mathematics Foundation for Engineers II. Topics from Linear Algebra: Solving systems of linear equations with Gaussian elimination, matrices and matrix algebra, inverse of matrices, special matrices (diagonal, triangular, symmetric), computing determinants; vectors and vector arithmetic, norm of a vector, dot products, cross-products and projections; complex numbers and complex number arithmetic. Topics from Statistics and Probability: sampling, summary statistics, graphical summaries; random variables, Poisson distribution, normal distribution, central limit theorem; large-sample confidence intervals for a population mean, small-sample tests for a population mean, basic ideas of statistical quality control. 3 cr, 6 lec, 3 tut. Credit restrictions: MATH 2050U, MATH 1850U, STAT 2800U, BUSI 1450U, HLSC 3800U, SSCI 2910U, STAT 2010U, STAT 2020U.

ENGR 0103U Mathematics Foundation for Engineers III. Initial-value problems, introduction to differential equations, differential equations as mathematical models; separable variables; linear equations, linear models, modeling with systems of differential equations; basic theory of linear differential equations, homogenous linear equations with constant coefficients; linear models: initial-value problems, linear models: boundary-value problems; definitions of Laplace transforms, inverse transforms and transforms of derivatives; systems of linear differential equations, homogenous linear systems, separable partial differential equations. 3 cr, 6 lec, 3 tut. Credit restriction: MATH 2860U.

ENGR 0105U Physics Foundation for Engineers. Introduction to basic mechanics, Newton's laws of motion; kinematics and dynamics in one and two dimensions; work and energy; friction; momentum and collisions; electric charge and Coulomb's law; electric field, electric flux, Gauss' law; electrostatic potential, capacitance; Kirchoff's laws in DC circuits; magnetic forces and magnetic field; Biot-Savart law; Ampere's law; magnetic flux, Faraday's law, inductance; AC circuits; introduction to nuclear physics. 3 cr, 6 lec, 3 tut. Corequisite: ENGR 0101U. Credit restriction: PHY 1010, PHY 1020.

ENGR 0107U Fluid Mechanics and Thermodynamics. Properties of fluids and their units; fluid statics and dynamics, conservation of mass and the continuity equation; Euler's equation; Bernoulli's equation; flow of viscous fluids; laminar and turbulent flows; flow in pipes and fittings; the Moody diagram; boundary layers; flow separation; First Law of Thermodynamics, Second Law of Thermodynamics; properties and behaviour of pure substances; ideal gases and mixtures; equation of state for a perfect gas; conduction, convection and radiation; solutions to steady-state and transient conduction problems. 6 lec, 3 tut. Prerequisite: ENGR 0101U. Corequisite: ENGR 0105U. Credit restriction: ENGR 2860U, ENGR 3930U, ENGR 2010U, ENGR 2320U, ENGR 2640U.

ENGR 0998U Engineering Internship Program. An optional internship work term for students in engineering and applied science programs aimed at providing significant professional experience and exposure to an engineering workplace. The work term is between 12 and 16 months duration, normally commencing in May and concluding by August of the following year. Registration in this course is conditional on the student obtaining and accepting an acceptable internship placement offer from an approved employer partner. Interns are visited/contacted as required by the course co-ordinator to assess their progress. Internship students are required to submit a report, following established criteria, within one month of completing the internship placement. The course is graded on a pass/fail basis and the grade appears in the student's academic transcript. Both grades have no numerical value and are not included in a student's grade point average. Prerequisites: Completion of three years of the academic program with a cumulative GPA of at least 2.3 and permission of the faculty.

ENGR 0999U Engineering Co-op Program. An optional co-op work term for students in engineering and applied science programs aimed at providing significant professional experience and exposure to an engineering workplace. The duration of the work term is between two and four months, normally during the summer. Registration in this course is conditional on the student obtaining and accepting an acceptable co-op placement offer from an approved employer partner. Co-op students are required to submit a report, following established criteria, within one month of completing the co-op placement. The course is graded on a pass/fail basis and the grade appears in the student's academic transcript. Both grades have no numerical value and are not included in a student's grade point average. A student can take this course more than once. Prerequisite: Permission of the faculty.

ENGR 1010U Calculus for Engineers I. Applications to engineering using differential calculus. Emphasis on limits, continuity, the derivative, Mean Value Theorem for derivatives and integrals, approximation by differentials, Fermat's Theorem, differentiation and anti-differentiation, definite integrals, areas between curves, and the Fundamental Theorem of Calculus. 3 cr, 3 lec, 1.5 tut. Prerequisites: Grade 12 Advanced Functions (MHF4U) and Grade 12 Calculus and Vectors (MCV4U). Credit restriction: MATH 1000U, MATH 1010U (starting in the 2012-13 academic year), MATH 1880U, BUSI 1900U. Cross-listing: MATH 1010U (2011-12 academic year only).

ENGR 1020U Calculus for Engineers II. A continuation of Calculus for students who have completed Calculus for Engineers I, emphasizing integral calculus: problem solving, calculations and engineering applications.

Applications to volumes, arc length, polar co-ordinates and functions of two or more variables. Multivariable calculus: partial derivatives, differential equations, Taylor and MacLauren series, double integrals. 3 cr, 3 lec, 1.5 tut. Prerequisites: ENGR 1010U. Credit restriction: MATH 1020U (starting in the 2012-13 academic year). Cross-listing: MATH 1020U (2011-12 academic year only).

ENGR 1030U Physics for Engineers I. This course provides an introduction to classical mechanics for engineering students. It gives an introduction to basic mechanics, Newton's laws of motion; kinematics and dynamics in one and two dimensions; work and energy; friction; momentum and collisions; angular momentum, torque and rotation of rigid bodies; gravitation; simple harmonic motion; mechanical and sound waves; static equilibrium; fluid mechanics; kinetic theory of gases and thermodynamics. 3 cr, 3 lec, 3 lab (bi-weekly), 1.5 tut. Prerequisites: Grade 12 Calculus and Vectors (MCV4U) (required); Grade 12 Physics (SPH4U) (recommended). Note: Students without the recommended physics prerequisite will be responsible for making up background material. Credit restriction: PHY 1010U (starting in the 2012-13 academic year), PHY 1030U, PHY 1810U. Cross-listing: PHY 1010U (2011-12 academic year only).

ENGR 1040U Physics for Engineers II. A continuation of Physics for Engineers I, focusing on electromagnetism for engineering students. Introduction to electromagnetism and optics: electric charge and Coulomb's law; electric field, electric flux, Gauss' law; electrostatic potential, capacitance; Kirchoff's laws in DC circuits. Magnetic forces and magnetic field; Biot-Savart law; Ampere's law; magnetic flux, Faraday's law, inductance; AC circuits. Electromagnetic waves; wave propagation; waves in matter. Geometrical and wave optics. Introduction to nuclear physics. 3 cr, 3 lec, 3 lab (bi-weekly), 1.5 tut. Prerequisites: ENGR 1030U. Credit restriction: PHY 1020U (starting in the 2012-13 academic year), PHY 1040U, PHY 1810U. Cross-listing: PHY 1020U (2011-12 academic year only).

ENGR 1060U Chemistry for Engineers. Introduction and applications of analytical, inorganic, organic and physical chemistry to engineering. Atoms, molecules, stoichiometry and gas laws; reactions, chemical kinetics, thermochemistry, entropy and free energy; electronic structure of atoms, bonding and molecular structure with emphasis on organic molecules; intermolecular forces, liquids and solids; electrochemistry, fuel cells and electrolytic cells. 3 cr, 3 lec, 2 lab (bi-weekly), 1.5 tut. Prerequisites: Grade 12 Chemistry (SCH4U). Credit restriction: CHEM 1010U, CHEM 1020U. Cross-listing: CHEM 1800U (2011-12 academic year only).

ENGR 1200U Introduction to Programming for Engineers. Introduction to the anatomy of a computer: CPU, memory, machine cycle, input and output devices, data representation; fundamental programming concepts: flowcharting, algorithm design, use of procedures, program control flow, arrays and vectors, arithmetic and logic operations, input and output, data declaration; principles of object oriented programming: classes, inheritance; programming in 'C++'. 3 cr, 3 lec, 2 tut.

ENGR 1250U Engineering Graphics. Engineering drawing techniques, dimensions and geometric tolerances, standard viewpoints and section planes, orthographic projections, use of 3-D solid modelling and CAD software. 3 cr, 3 lec, 1.5 lab. Credit restriction: ENGR 3200U.

ENGR 1400U Information Technology for Engineers. IT trends and state-of-the-art applications. Introductory design concepts, objectives and tradeoffs in the areas of scientific computing, computers, communications and signal processing. Using scientific computing software tools to perform mathematical computations and functions, data analysis, visualization (two and three dimensional plotting and curve fitting), and familiarization with modelling and simulation. An overview of computer systems, including I/O, peripheral devices, memory, storage, CPU, system software, operating systems, utilities, security and web browsers. An overview of communication systems and signal processing including analog to digital conversion, compression, broadband wired and wireless technologies, networks, architectures, bandwidth, power and performance measures. 3 cr, 3 lec, 2 tut.

ENGR 1850U Linear Algebra for Engineers. This course develops the fundamental principles of linear algebra and demonstrates their applications to engineering. Topics include the algebra of matrices; systems of linear equations; determinants and matrix inverses; real and complex vector spaces, linear independence, bases, dimension and co-ordinates; inner product spaces and the Gram-Schmidt process; least squares and regression; linear maps and 258 matrices, change of basis and similar matrices; eigenvalues, eigenvectors and matrix diagonalization; quadratic forms. 3 cr, 3 lec, 1.5 tut. Corequisites: ENGR 1010U. Credit restriction: BUSI 1900U, MATH 2050U. Cross-listing: MATH 1850U (2011-12 academic year only).

ENGR 2010U Thermodynamic Cycles. A study of the basic concepts involved in thermodynamics, including: nature of thermodynamics; First Law of Thermodynamics; Second Law of Thermodynamics; properties and behaviour of pure substances; ideal gases and mixtures; equation of state for a perfect gas; Carnot and Rankine Cycles; thermodynamic efficiency; steam tables and charts; superheating and reheating; regenerative feedwater heating; conventional and nuclear steam cycles; heat exchanger thermal balance; steam turbine expansion lines; and steam generator thermal characteristics. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: PHY 1010U, MATH 1020U. Credit restriction: ENGR 2320U.

ENGR 2020U Statics and Dynamics. This course provides fundamental engineering knowledge of static and dynamic force/moment equilibrium and time varying performance of different systems. It also examines the work, energy, impact, force, and kinematics and dynamics of systems of particles and rigid bodies. The course description consists of: resultant and equilibrium of force systems; distributed loads; hydrostatics; conditions of equilibrium and application to particles and rigid bodies; analysis of statically determinate structures including beams, trusses and arches; friction; centric; principle of virtual work; Cartesian, normal-tangential, and polar components of velocity and acceleration in two and three dimensions; rotating frames; kinematics of particles and rigid bodies; force/acceleration; work/energy; impulse/momentum; conservative and non-conservative systems; systems of streams of particles and rigid bodies; introduction to three dimensional problems of particles and rigid body dynamics. 3 cr, 4 lec, 2 tut. Prerequisites: MATH 1020U,MATH 1850U, PHY 1010U.

ENGR 2070U Numerical Methods for Engineers. This course develops and applies algorithms for solving numerical problems arising in engineering. Topics include: solution of nonlinear equations in one variable, interpolation and data-fitting, numerical differentiation and integration, solution of differential equations, and elements of numerical linear algebra. Students will use computer software such as Maple or Matlab in the solution of numerical problems in engineering applications. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 1020U, ENGR 1850U. Credit restriction: MATH 2070U (starting in the 2012-13 academic year), MATH 2072U. Cross-listing: MATH 2070U (2011-12 academic year only).

ENGR 2110U Discrete Mathematics for Engineers. Sets and set operations, propositional logic, predicate logic, rules of inference; methods of proof and reasoning, modular arithmetic, counting, pigeonhole principle, induction, deduction, relations, functions, graphs, graph algorithms, shortest path, trees, combinatorics; applications to cryptosystems, hashing functions, coding. 3 cr, 3 lec, 2 tut. Prerequisites: MATH 1850U, MATH 1020U.

ENGR 2140U Problem Solving, Modelling and Simulation. Students will explore processes and skills needed to define, evaluate and develop a range of solutions to design problems while working alone or as members of a group. Topics include: methods for estimating and verifying the results and levels of accuracy of alternate designs; mathematical modelling of simple processes and equipment; computer programs for solving systems of equations; use of simulation in the design and visualization of continuous and discrete process. 3 cr, 2 lec, 2 tut. Prerequisites: ENGR 1200U, MATH 1020U, PHY 1020U. Corequisite: MATH 2860U.

ENGR 2200U Electrical Engineering Fundamentals. Coulomb's, Ohm's, and Kirchoff's laws; electrostatics and electromagnetics; resistance, capacitance, inductance and impedance and reactance; series and parallel circuits, independent and dependent voltage and current sources; energy, power; superposition, Thevenin, and Norton Theorems; maximum power transfer; node-voltage and mesh-current analysis of DC and AC circuits; initial, steady state and transient conditions; complex power and phasor domain analysis; poly-phase circuits and transformers. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisites: ENGR 1400U, PHY 1020U, MATH 1020U.

ENGR 2210U Circuit Analysis. Impulse and step responses and their relationship. Convolution Integral and its application to circuit analysis. Mutual inductance and transformers. Applications of Laplace transform to analyze electric circuits. Natural frequencies of a network. Transfer function and frequency response of circuits. Poles and zeros of transfer function and their meaning in electric circuits. Two-port networks, impedance and admittance matrices, hybrid and transmission matrices, parallel and series connection of two-port networks. Analog filter approximation and design including Butterworth, Chebyshev, and elliptic filters, active filters, passive filters. 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 2200U, MATH 2860

ENGR 2220U Structure and Properties of Materials. Atomic structure and atomic bonding in solids, structure of crystalline solids, solidification and defects, alloys and phase diagrams, mechanical properties of metals and alloys, semiconductors, organics, polymers, crystalline ceramics, glass and fibre optics, composites, biomaterials, magnetic materials. 3 cr, 3 lec. Prerequisite: CHEM 1800U or CHEM 1020U.

ENGR 2230U Statics. This course provides fundamental engineering knowledge of static systems, bodies at rest, force and moment equilibrium of rigid bodies, and mechanics of materials and deformable bodies. Course topics include: forces; moments of forces; couples; resultant and equilibrium of force systems; distributed loads; equilibrium of particles and rigid bodies; analysis of structures including beams, structural analyses including trusses, frames and machines; mechanical joints, the concept of internal forces, shear and moment forces and diagrams, relations between distributed load, shear and moments; friction forces on mechanical components, centroid, moment of inertia, parallel axis theory, Mohr's circle for moment of inertia, concept of virtual work. 3 cr, 3 lec, 1 tut. Prerequisites: PHY 1010U, MATH 1020U.

ENGR 2250U Introductory Electronics. Conduction in semiconductors; single-time constant networks; operational amplifiers; diodes; non-linear circuit applications; bipolar junction and field-effect transistors; transistor amplifiers; small and large signal models; amplifier frequency response and analysis; multi-stage amplifiers; filters and oscillators; digital logic, integrated and memory circuits. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 2200U.

ENGR 2260U Statics and Solid Mechanics. This course provides fundamental engineering knowledge of static systems, bodies at rest, force and moment equilibrium of rigid bodies, and mechanics of materials and deformable bodies. Course topics include: forces; moments of forces;

couples; resultant and equilibrium of force systems; distributed loads; equilibrium of particles and rigid bodies; analysis of structures including beams, trusses, frames and machines; mechanical joints; centric; moment of inertia; plane stress and strain; tension and compression test; Hooke's law; Poisson's ratio; axial load; principle of superposition; thermal stress; torsion of circular shafts; pure bending; transverse shear; shear stress in beams and thin-walled members; combined loading; stress and strain transformations; Mohr's circle; design of beams and shafts; deflections of beams and shafts; statically indeterminate beams and shafts; buckling of columns. 3 cr, 4 lec, 2 lab (biweekly), 2 tut. Prerequisites: MATH 1020U, PHY 1010U. Note: This course will not be offered after the 2009-2010 academic year.

ENGR 2310U Concurrent Engineering and Design. This course covers the modern integrated product development process. Unlike the traditional product development approach, concurrent (simultaneous) engineering and design reunites technical and nontechnical disciplines and brings forward a philosophy of cross-functional cooperation in order to create products which meet pre-determined objectives, and are better, less expensive, and more quickly brought to market. It is a process in which appropriate disciplines are committed to work interactively to analyze market and customer requirements in order to improve the end-to-end process by which products are conceived, designed, manufactured, assembled, sold to the customer, serviced, and finally disposed of. The concept of design is presented. Brainstorming, creativity methods, design for manufacturing, design for assembly, design for cost, and design for quality, life cycle design, reverse engineering, and rapid prototyping are addressed. Teamwork and communication skills are developed. 3 cr, 3 lec, 2 lab. Prerequisite: ENGR 3200U.

ENGR 2320U Thermodynamics. Introductory concepts and definitions; energy, work and heat; the nature of thermodynamics; the First Law of Thermodynamics; the Second Law of Thermodynamics; control mass and control volume analyses; properties and behaviour of pure substances; ideal gases and mixtures; equation of state for a perfect gas; irreversible and reversible processes; the Carnot cycle; entropy; Clausius inequality; entropy change in open and closed systems; isentropic processes; introduction to exergy; power and refrigeration cycles. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisite: PHY 1010U.

ENGR 2330U Mechanical Equipment and Systems. Heating, cooling and refrigeration systems; fluid systems; pumps, compressors, turbines; valves; piping design; pressure vessels; gear and flexible drive systems; bolted and welded joints; heat exchangers and shields; measurements in mechanical systems of solids and fluids; free and forced vibration, single-plane and two-plane balancing of rotating machines, mechanism balancing; preventive, predictive and corrective maintenance; life cycle aspects of mechanical equipment and systems. 3 cr, 3 lec, 2 lab (biweekly). Prerequisite: ENGR 2640U or ENGR 2860U or ENGR 0107U.

ENGR 2340U Engineering Operations and Project Management I. (Not offered as of 2011-2012) An introduction to the functional area of production and operations management as practiced in engineering and manufacturing industries and the services sector. It includes decision-making, engineering project management, facility layout in engineering, manufacturing and services industries, waiting lines, quality control, just-in-time systems, forecasting, aggregate planning, inventory management, materials requirements planning and operations scheduling. 3 cr, 3 lec.

ENGR 2350U Engineering Operations and Project Management II. (Not offered as of 2011-2012) A second level course that continues to study the functional area of production and operations management as practiced in engineering and manufacturing industries and the services sector. It includes decision-making, engineering project management, facility layout in engineering, manufacturing and services industries, waiting lines, quality control, just-in-time systems, forecasting, aggregate planning, inventory management, materials requirements planning and operations scheduling. 3 cr, 3 lec. Prerequisite: ENGR 2340U.

ENGR 2360U Electric Power Systems. Power system overview: generation, transmission, and distribution; elements of power systems: inductors, transformers, generators, circuit breakers, transmission lines, DC machines, AC machines, synchronous machines; single and three-phase systems; equivalent circuits, operating modes; network calculations: power flow, active and reactive power, fault analysis and protection, power system stability. 3 cr, 3 lec, 2 tut (biweekly). Prerequisite: ENGR 2790U.

ENGR 2420U Solid Mechanics. This course provides the fundamental engineering knowledge of mechanics of solids including axial loading, plane stress and strain; tension and compression, elastic deformation and Hooke's law, Poisson's ratio, principle of superposition, thermal stress, torsion of circular shafts, pure bending, transverse shear, shear stress in beams and thin-walled members, combined loading, stress and strain transformations; Mohr's circle, deflections of beams and shafts, design of beams and shafts, statically indeterminate beams and shafts, buckling of columns, energy method. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisite: ENGR2230U.

ENGR 2430U Dynamics. This course provides fundamental engineering knowledge of time varying systems. It also examines the kinematics and kinetics of particles and rigid bodies. Course topics include: kinematics of particles; rectilinear and curvilinear motions; Cartesian, normal-tangential, polar and cylindrical components of velocity and acceleration in two and three dimensions; planar kinematics of rigid bodies; general plane motion; rotating frames; kinetics of particles; kinetics of systems of particles; planar kinetics of rigid bodies; force and acceleration; friction; work and energy; conservative and non-conservative systems; impulse and momentum; introduction to three-dimensional kinematics of a rigid body. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 2230U or ENGR 2260U, MATH 1850U.

ENGR 2450U Digital Systems. Boolean algebra and truth tables; combinational logics: AND, OR, NOT, XOR gates; sequential circuits: flip-flops, counters, memory circuits; logic circuit analysis, synthesis, and optimization; A/D and D/A interfaces; ROM and RAM; Field Programmable Gate Array (FPGA) and Application Specific Integrated Circuits (ASIC). 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 2110U.

ENGR 2490U Software Project Management. Software engineering course with emphasis on advanced methods and procedures for managing a software development project. Includes project planning, scheduling, and cost estimation, project organizational types, staffing and training considerations, leading and motivating computer personnel, and methods for measuring and controlling a project. Emphasizes IEEE software engineering management standards and keys to project success. Class project required. 3 cr, 3 lec, 3 tut. Prerequisite: ENGR 2710U.

ENGR 2500U Introduction to Nuclear Physics. An introduction to nuclear and reactor physics. Topics include: elements of relativity, radioactivity, alpha, beta and gamma decay; binding energy, interaction of radiation with matter; neutron cross sections, neutron scattering and absorption; fission; fusion; neutron density and flux, neutron diffusion, diffusion equation; neutron multiplication factor and reactivity, reactor equation, four and six factor formulae, neutron flux distribution, flux flattening, nuclear energy and applications of radioisotopes in various fields. 3 cr, 3 lec, 1 tut. Prerequisites: MATH 1020U, PHY 1020U or ENGR 0101U and ENGR 0105U. Credit restriction: PHY 2060U.

ENGR 2520U Fundamentals of Electromagnetics. Vector analysis, including orthogonal co-ordinate systems, and the calculus of field quantities; length, surface and volume; line, surface, and volume integrals; del operator and gradient of a scalar; divergence theorem; Stoke's theorem; Laplacian, classification of vector fields; electrostatic fields including the concepts of electric potential, capacitance, and current and current density; magnetostatic fields including inductance. 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 2200U, MATH 2860U.

ENGR 2530U Complex Analysis for Engineers. Basic complex analysis; complex number and topology of complex plane, continuity and differentiability of complex functions, power series and convergence tests, elementary complex functions, contour integration, Cauchy theorem and Cauchy integral formula, Taylor and Laurent series, residue theorem; applications selected from evaluation of real integrals, planar flows and potential theory, Laplace transform and inversion of residues, transform solution of ordinary differential equations with constant coefficients, complex Fourier Series, complex Fourier Transform and its relationships with Laplace Transform, convolution property of Fourier Transform. Application to engineering systems, 3 cr, 3 lec, 2 tut. Prerequisite: MATH 2860U.

ENGR 2640U Thermodynamic and Heat Transfer. Nature of thermodynamics, First Law of Thermodynamics, Second Law of Thermodynamics. Control mass and control volume analyses. Properties and behaviour of pure substances. Ideal gases and mixtures; equation of state for a perfect gas. Introduction to conduction, convection and radiation. Solutions to steady-state and transient conduction problems. Free and forced convection for laminar and turbulent flows. Thermal radiation between black bodies. Introduction to heat exchangers. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: MATH 1020U, PHY 1010U.

ENGR 2710U Object Oriented Programming and Design. Introduction to the fundamentals of software design through object-oriented programming, abstraction principles, information hiding and encapsulation. Introduction to design tools like pseudo-coding and basic Unified Modelling Language (UML) diagrams. Introduction to simple data structures, including linked lists, stacks, and queues, and their applications to Engineering problems. The content outline by topic is as follows: principles of object oriented programming; debugging and analysis; maintain and document programs using techniques of good programming style; basic and advanced, aspects of abstraction, recursion, parameter passing, file I/O and classes; object libraries and packages; object-oriented analysis and design using UML object interaction, messaging, association, and composition diagrams; abstract data types and basic data structures like lists, stacks, and queues. 3 cr, 3 lec, 2 tut. Prerequisite: ENGR 1200U.

ENGR 2715U Data Structures. This course provides the students with a solid foundation in data structures and their associated algorithms (e.g. traversal, sorting, searching, element addition and removal) both from a theoretical, as well as practical implementation perspective. The main objective of the course is to teach students how to select and design data structures and algorithms that are appropriate for problems that they might encounter. The correctness and computational complexities of the algorithms as related to the various data structures presented is also studied. Topics covered are: analysis of algorithms, dictionaries, trees (balanced trees, binary-trees, spanning trees, etc.), hashing, sorting, graphs, sets and maps, strings and pattern matching. 3 cr, 3 lec, 2 tut. Prerequisite: ENGR 2710U.

ENGR 2720U Software Requirements Specification and Analysis. Overview of software development models: waterfall, incremental/iterative, structured vs. object-oriented, extreme programming. Product Design and Analysis phase of software development: product planning, project mission statement, and software requirements specification. Models, notations, and processes for software requirements identification, representation, analysis, and validation will be studied with an emphasis on Use Case Modelling. Introduction to Software Architectural Design emphasizing the Unified Modelling Language (UML). 3 cr, 3 lec, 3 lab (biweekly), 2 tut (biweekly). Prerequisite: ENGR 2710U.

ENGR 2790U Electric Circuits. Basic concepts of electricity, magnetism and electric circuits; DC and AC driven circuits; series and parallel circuits; Ohm's Law, Kirchhoff's Laws, Thevenin's Theorem, Norton's Theorem, operation of electrical equipment such as instruments, motors, generators; response to step functions; response to sinusoids, steady state AC, resonance, parallel resonance, AC power, power factor, power factor correction; introduction to magnetic circuits: coils, solenoids, transformers; single and three phase circuits, basic operation of electrical measuring equipment; basics of electronics: diodes, transistors, operational amplifiers. 3 cr, 3 lec, 2 lab (biweekly), 2 tut. Prerequisites: MATH 1020U, PHY 1020U, or ENGR 0101U and ENGR 0105U

ENGR 2800U Statistics and Probability for Engineers. Sample spaces, probability, conditional probability, independence. Bayes' theorem, probability distributions, algebra of expected values, descriptive statistics. Inferences concerning means, variances, and proportions. Parameter estimation, correlation. Introduction to quality control and reliability. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 1020U. Credit restriction: STAT 2800U (starting in the 2012-13 academic year), BUSI 1450U, HLSC 3800U, SSCI 2910U, STAT 2010U, STAT 2020U. Cross-listing: STAT 2800U (2011-12 academic year only).

ENGR 2810U Advanced Engineering Mathematics. This course extends the study of calculus and differential equations for engineering applications, including multiple integration: integral theorems, polar co-ordinates and changes of variables; differential and integral calculus of vector valued functions of a vector variable: vector algebra, line and surface integrals, Green's, Gauss' and Stokes' theorems; and introduction to partial differential equations: Heat equation, Laplace's equation, wave equation. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 1020U. Credit restriction: MATH 2020U, MATH 2810U (starting in the 2012-13 academic year). Cross-listing: STAT 2800U (2011-12 academic year only).

ENGR 2860U Fluid Mechanics. Fundamentals of fluid mechanics, including: properties of fluids and their units; fluid static. Kinematics of fluids, conservation of mass and the continuity equation. Dynamics of fluids; Euler's equation; Bernoulli's equation. The energy equation; energy grade lines. Flow of viscous fluids; laminar and turbulent flows; flow in pipes and fittings; the Moody diagram. Flows around immersed bodies; lift and drag on bodies. Boundary layers; flow separation. Flow measurement techniques. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: MATH 1020U, PHY 1010U.

ENGR 2870U Differential Equations for Engineers. A study of differential equations that arise as models of phenomena in engineering. Topics include: first order equations; linear equations; second-order equations and their applications; systems of linear equations; series solutions; Laplace transforms; introduction to partial differential equations. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 1020U, ENGR 1850U. Credit restriction: MATH 2050U, MATH 2860U (starting in the 2012-13 academic year). Cross-listing: MATH 2860U (2011-12 academic year only).

ENGR 2950U Radiation Protection. Defines and introduces basic concepts in radiation safety; dose limits and risk; protection from external radiation: time, decay and distance, shielding, access control; external radiation hazards; radiation surveys; internal radiation hazards; behaviour of internal sources, annual limit on intake, derived air concentration for tritium, radioiodines, particulates; bioassay; contamination control; basic principles of radiation dosimetry; calculation of internal and external body radiation exposures; regulations concerning radioactive materials; safe working with radiation. 3 cr, 3 lec, 2 lab (biweekly). Prerequisite: ENGR 2500U. Credit restriction: RADI 2100U.

ENGR 3000U Automotive Component Design. Component design of powertrain: manual and automatic transmissions, transfer case, planetary gears, final drive including differential lock system, propshaft, synchronizing element, helical and bevel gears. Design of transmission systems; need for an automatic transmission, function of manual and automatic transmission system; design of planetary gear train transmissions, and peripheral components; Hydraulic power supply, electronic and hydraulic controls in automatic transmissions; transmission arrangements and performance characteristics; chassis design. Heating and cooling systems design for passenger comfort; design of engine cooling and exhaust systems. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 3030U, ENGR 4260U.

ENGR 3010U Introduction to Automotive Engineering. This course is designed to introduce students to the five essential themes in automotive engineering including, control, design, materials and manufacturing, powertrains and emissions, and structure chassis and body. The fundamental functionality and typical configurations of automotive vehicles and their subsystems, including powertrain, steering systems, braking systems, suspensions, vehicle body structures, vehicle interior, tires, and electrical components will be briefly reviewed. The different configuration features of engine location, traction wheels lay-out, on-road and off-road vehicles, special purpose vehicles, passenger cars, buses and articulated vehicles will be discussed. This course provides the background needed for subsequent automotive engineering courses. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 2230U.

ENGR 3030U Computer-Aided Design. Geometric/solid modelling, computer graphics and feature modelling. Finite element analysis, discretization and modelling, selection of elements, treatment of boundary conditions, checking for accuracy. Design optimization, optimization models, algorithms for optimization. State-of-the-art software packages will be introduced and case studies will be employed. 3 cr, 4 lec, 2 lab. Prerequisites: ENGR 2310U, ENGR 2420U or ENGR 2260U or ENGR 2420U.

ENGR 3070U Probability and Random Signals. Basic concepts of probability theory: the axioms of probability, conditional probability, Bayes' theorem, mutally exclusive and independent events. Single random variable: discrete and continuous random variables, probability mass and density functions; mean, median, mode, variance, and functions of a random variable; Markov and Chebyshev inequalities; reliability of series and parallel components, mean time to failure and failure rate functions. Multiple random variables; joint cumulative distribution and probability density functions, independence, covarienace correlation, and linear transformations; joints Gaussian random variables; sum of random variables, law of large numbers and central limit theorem. Statistics: sampling estimation, confidence intervals and hypothesis testing. Random processes; wide-sense staionarity autocorrelation function and power spectral density. Gaussian processes, White noise and noise equivalent bandwidth. 3 cr, 3 lec, 2 tut. Prerequisite: ENGR 3110U.

ENGR 3100U Modern Control Systems. Mathematical models of systems: differential equations and linear approximations of physical systems; open- and closed-loop control systems: parameter variations, steady-state error, sensitivity analysis; performance of feedback control systems: time-domain performance specifications, transient response, and steady state error; stability analysis: Nyquist and Routh-Hurwitz criterion; frequency response methods; stability in the frequency domain; time domain analysis of control systems. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 3110U. Credit restriction: ENGR 4100U.

ENGR 3110U Signals and Systems. Linear, time invariant systems; impulse response and transfer function; auto-correlation and power spectrum; convolution; Fourier series; Laplace transforms and Fourier transforms; discrete-time signals and systems; Z-transforms and discrete Fourier transforms; poles and zeros, stability of analog and digital filters. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisites: ENGR 2530U, ENGR 2210U (ENGR 2210U will be required starting 2010-2011).

ENGR 3130U Communication Systems. Classifications of signals, Fourier transform; and properties, basic operation on signals; classifications of systems, filter types and design requirements distortionless transmission, bandwidth, and low-pass/band-pass signals. Modulation requirements and design trade-offs; amplitude modulation (AM, DSBSC, SSB, VSB); frequency modulation; FDM, AM and FM radio broadcasting. Digital communications design objectives and constraints; filtering, sampling, quantization, line coding; TDM, PCM, DPCM, DM pulse shaping; Nyquist-I criterion, intersymbol interference; adaptive equalization and LMS algorithm; coherent and con-coherent; digital modulation techniques: BASK, BFSK, BPSK, OPSK. Source coding fundamentals; entropy and Huffman and Lempel-Ziv lossless data compression; channel coding fundamentals; interleaving, error detection schemes and ARQ techniques, FEC and Hamming codes. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 3110U.

ENGR 3140U Computer Architecture. Computer systems generation: main-frame, mid-range, microcomputers; peripherals and interfaces; bus design; input/output systems and technologies; central processing units: arithmetic logic and control units; semiconductor memory (RAM and ROM), magnetic disks and tapes, optical disks; assembly and high-level programming language; integer and floating point arithmetic, pipelining and parallelism; CISC vs. RISC. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 2450U.

ENGR 3160U Engineering Operations and Project Management. This course introduces students to the field of operations and project management as practiced in various industries and the services sector. The impacts on the external environment, safety and regulatory constraints will be considered in the design and analysis of these systems. Topics include decision analysis; project management; waiting line models in customer service operations; maintenance management; process improvement techniques such as process mapping; and job design for both service and engineering operations. 3 cr, 3 lec.

ENGR 3170U Engineering Production Management. This course introduces students to the contemporary models and methods in all aspects of engineering production planning and control. The impacts on the external environment, safety and regulatory constraints will be considered in the design and analysis of these systems. Topics include production planning; workforce and resource allocation; personnel scheduling and distribution network design using linear, integer and dynamic programming models; facility design; forecasting; inventory management; materials requirements planning; quality control; lean manufacturing principles and job scheduling. 3 cr, 3 lec.

ENGR 3180U Design Principles and Project Management in Electrical Engineering. This course covers design process and methodology – including design specifications, parameters, variables, optimization, implementation, interface, troubleshooting, tradeoffs, complexity, performance, and documentation – in various areas of Electrical Engineering, including transmission systems, electronic circuitry, communications networks, control systems, power systems, and software systems; the course also focuses on project management fundamentals, including project stakeholders, scope, cost, scheduling, risk, resource, integration, and quality management. 3 cr, 3 lec, 2 lab, 1 tut. Prerequisites: ENGR 2250U, ENGR 2450U, ENGR 2520U, ENGR 2710.

ENGR 3190U Manufacturing and Production Processes. The role and characterization of manufacturing technology within the manufacturing enterprise is studied. Topics include an overview of the deformation process, joining processes, consolidation processes, material removal processes, and material alteration processes; process selection and planning; just-in-time production; computer control of manufacturing systems. 3 cr, 3 lec, 3 lab (biweekly). Prerequisites: ENGR 2220U, ENGR 2310U.

ENGR 3200U Engineering Graphics and Design. Engineering drawing techniques, dimensions and geometric tolerances, standard viewpoints and section planes, orthographic projections, use of 3-D solid modelling and CAD software (and possibly other design and graphics software); a case-based introduction to engineering design; use of graphics and illustrations in engineering design; design projects by individuals and groups; basics of project management, such as organizing, planning, scheduling and controlling; application of such computer tools as spreadsheets, project management software, computer-aided drafting and design tools. 3 cr, 3 lec, 1.5 lab, 1.5 tut.

ENGR 3210U Mechanical Vibrations. Fundamental concepts of vibrations of mechanical systems; free vibrations of single degree of freedom systems; various types of damping and vibration absorption; forced vibrations; vibration measuring instruments; steady state and transient vibrations; vibrations of multi-degree of freedom systems; vibration isolation; modal analysis; vibrations of continuous systems; introduction to non-linear vibrations, including nonlinear springs and non-linear damping. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisite: ENGR 2020U or ENGR 2430U.

ENGR 3220U Machine Design. Theory and methodology related to conceptual design; review of the methods used in stress analysis; simple design factor approach; variable loads; stress concentrations; bolts and bolted joints; welded joints; springs; shaft and bearing design; brakes and braking systems; design for recycling; reliability, maintenance and cost considerations. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 2310U, ENGR 3270U, ENGR 2260U or ENGR 2420U.

ENGR 3230U Electronic Circuit Design. Non-ideal op-amp characteristics; transistor as a switch; transistor differential and multistage amplifiers, integrated circuit biasing techniques; power amplifiers, tuned amplifiers; feedback amplifier analysis; stability and compensation techniques for amplifiers using negative feedback; transistor amplifiers, differential and multistage amplifier, integrated circuit biasing techniques; power amplifiers, tuned amplifiers; op-amp applications; oscillators; CMOS logic design. Classes of power amplifiers, power BJTs and MOSFET power transistors. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 2250U.

ENGR 3240U Applications for Electromagnetics. Time-varying electromagnetic fields; Maxwell's equations and electromagnetic waves; waves in an unbounded medium; reflection, transmission, and refraction of waves at planar interfaces; parallel-plate and dielectric slab waveguides; cylindrical waveguides and cavity resonators, transmission lines; steady-state sinusoidal behaviour and standing waves, transient performance and impedance matching; field-matter interactions and elementary antennas. 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 2520U, ENGR 2530U.

ENGR 3250U Electric Machines. Three-phase circuits; magnetic circuits; electrical transformers; force and torque generation; asynchronous machines, induction machines, DC machines; steady state characteristics of electric machines and variable speed drives; power electronics energy converters; generation, transmission, distribution, and utilization of electric power. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 3240U.

ENGR 3260U Introduction to Energy Systems. Energy systems, resources and use; energy classifications and terminology; energy sources and currencies; energy supply and demand; energy conversion and utilization technologies; energy storage and distribution; energy use in countries and sectors of economies; energy intensity; global energy flows and utilization patterns; principal fuels; fuel science and technology: origins of fuels, classifications and physical and chemical properties of fuels, fuel handling and fire hazards, non-conventional fuels; sustainability, sustainable development and energy; clean energy systems. Environmental impact of energy systems such as power generation, industrial processes and transportation; air, soil and water pollution and their effects on the environment; generation mechanisms of chemical pollutants, photochemical pollutants and smog; Introduction to renewable energy resources (solar, wind, geothermal, biomass), photovoltaics, microturbines. Introduction to energy storage systems. Introduction to hydrogen and fuel cells. Introduction to life cycle assessment, industrial ecology, and key environmental tools. Application of energy and exergy analysis to energy systems. 3 cr, 3 lec. Prerequisites: ENGR 2320U or ENGR 2010U, or ENGR 2640U, ENVS 1000U.

ENGR 3270U Kinematics and Dynamics of Machines. Classification of mechanisms; velocity, acceleration and force analyses; graphical and computer-oriented methods of analyses; balancing, flywheels, gears, gear trains, and cams. Introduction to Lagrangian dynamics; Lagrange's equations of motion; Hamilton's equations, and Hamilton's principle. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisite: ENGR 2020U or ENGR 2430U.

ENGR 3280U Fundamentals of Computer-Aided Design Tools. Introduction to the concepts of computer-aided design (CAD) tools using a state-of-the-art CAD software package. Subjects include design process, parametric design, surface modelling, solid modelling, design assembly, documentation with computer-aided drawings, and dimensioning. The basics of finite element analysis (FEA), optimization, and rapid prototyping will also be introduced. 3 cr, 3 lec, 1 lab. Prerequisites: ENGR 3200U, MATH 1850U.

ENGR 3290U Powertrain Design. This course introduces the fundamental design principles, general design procedures, typical constructional arrangements, and basic parameter selection of essential components and subsystems of automotive powertrains. Topics covered include, evaluation of various power plant and driveline characteristics on vehicle acceleration performance and fuel economy, manual transmission design, automatic transmission design. The principles of electrical and hybrid electrical vehicle propulsion systems will also be introduced. The students will develop the ability to design typical automotive powertrain components and subsystems through selecting appropriate constructions and determining basic design variables based on design principles, physical laws, legislations, criteria and constraints. Some design experience will be gained by completing required laboratory reports and design projects. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 3010U, ENGR 3270U

ENGR 3300U Integrated Manufacturing Systems. Facility layout; cellular manufacturing; fundamentals of automation; automatically-guided vehicles; flexible manufacturing; group technology; computer aided process planning; forecasting; inventory management and control; production planning and control; production activity control systems. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 3030U, ENGR 3190U.

ENGR 3320U Fluid Power Systems. The course reviews relevant fluid mechanics principles and proceeds with treatments of individual components. Components analyzed include: pumps, actuators, lines, valves and other related components. Discussions of individual components include: principles of operation, mathematical models, and design considerations. Analysis and design of fluid power systems used in industrial and processing equipment. Selected topics to include: positive displacement components, control devices, actuators, fluid transmission and system dynamics. 3 cr, 3 lec, 2 lab (biweekly). Prerequisites: ENGR 2860U, ENGR 3350U.

ENGR 3330U Circuit Design. The focus of this course is on electric and electronic circuit design. Frequency response, transfer function, feedback, oscillation and stability; lowpass, high-pass, and band-pass filters, quality factor and Bode plots; passive and active filters; circuit analysis and network synthesis; power electronic circuits: amplifiers and switches. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisite: ENGR 2790U.

ENGR 3350U Control Systems. Analysis and synthesis of linear feedback systems by classical and state space techniques. Nonlinear and optimal control systems. Modelling of dynamic systems; analysis of stability, transient and steady state characteristics of dynamic systems; characteristics of feedback systems; design of PID control laws using frequency response methods and the root locus technique. Introduction to nonlinear and optimal control systems. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 2790U, MATH 2860U.

ENGR 3360U Engineering Economics. Aspects of theoretical and applied economics relevant to engineers, including an introduction to fundamental principles of micro and macroeconomics. Microeconomics topics include scarcity, opportunity cost, diminishing returns, elasticity, industrial organization, economies of scale and concentration. Macroeconomics topics include unemployment, inflation, economic growth, the multiplier, equilibrium, fiscal policy and monetary policy. The principle of money and banking are introduced along with the role of the Bank of Canada. Applied economics topics covered include cost concepts, time value of money, comparison of alternatives, depreciation, tax considerations, economic analysis of projects, breakeven, sensitivity and risk, and decision models. Other topics covered include: economic decision analysis applied to private and public sector capital projects, discounted cash flow methods, lease analysis, replacement decisions, inflation impacts and public sector project analysis. 3 cr, 3 lec.

ENGR 3380U Strength of Materials. Principles of statics as applied to deformable solid bodies; stress and strain; Hooke's law, elastic behaviour of simple members under axial force, tension, compression, shear, torsion; bending and deflection of beams; design of beams, trusses, frames and shafts; column loads and buckling; impact loading; stability of structures. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 2220U, PHY 1010U. Credit restriction: ENGR 2260U.

ENGR 3390U Mechatronics. This course provides students with the tools required to design, model, analyze and control mechatronic systems; i.e. smart systems comprising electronic, mechanical, fluid and thermal components. The techniques for modeling various system components will be studied in a unified approach developing tools for the simulation of the performance of these systems. Analysis will also be made of the various components needed to design and control mechatronic systems including sensing, actuating, and I/O interfacing components. 3 cr, 3 lec, 2 lab, 1 tut. Prerequisites: ENGR 3270U, ENGR 3350U.

ENGR 3410U Electromechanical Energy Conversion. This course provides an understanding of the principles of electromechanical energy conversion and introduces some common devices employed in the process. Specific topics covered include the principles of electromechanical energy conversion; ferromagnetic materials and their properties; basic operating concepts and steady state models for transformers, dc machines, and ac machines; electromechanical test and measurement procedures; characteristics and behaviour of machines. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 2790U, ENGR 2320U or ENGR 2640U.

ENGR 3420U Energy and Environmental Impact. Environmental impact of energy systems such as power generation, industrial processes and transportation. Air, soil and water pollution. Pollutants from power production and engines and their effects on the environment, generation mechanisms of chemical pollutants, photochemical pollutants and smog, fluid mechanics of jets, plumes, thermals and turbulent diffusion in the atmosphere. Design for environment methods, including pollution prevention techniques, life cycle assessment, pollution abatement devices and control methods, including exhaust gas treatment, absorption, filtration, scrubbers. Industrial ecology. Environmental legislation. Design of sustainable energy systems. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 3260U, ENVS 1000U.

ENGR 3450U Combustion and Engines. Combustion fundamentals, including flame stoichiometry, chemical kinetics, flame temperature, pre-mixed and diffusion flames. Applications to engineered combustion systems such as furnaces and fossil fuelled engines. Continuous and unsteady combustion systems. Internal combustion engines, including cycles, fuels and lubricants, supercharging, carburetion, valving, manifolding, combustion chamber ignition and fuel injection; engine performance and testing. Design of combustors and engines. Methods for increasing combustion efficiency and reducing pollutant formation. Pollution reduction techniques. Safety issues. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: CHEM 1800U, ENGR 2320U, or ENGR 2640U.

ENGR 3460U Industrial Ergonomics. The biology of work; anatomical and physiological factors underlying the design of equipment and work places; biomechanical factors governing physical workload and motor performance; Circadian rhythms and shift work; measurement and specification of heat, light and sound levels with respect to the design of workplaces. Detailed analyses will be made of several cases in which human factors methods have been applied to improve the efficiency with which human/machine systems operate. 3 cr, 3 lec, 1 tut.

ENGR 3490U Microprocessor Systems Design. Basic structure of a computer; assembly-language and high level language programming; machine language and step-by-step instruction execution and debugging; digital I/O; analog to digital conversion; interrupt handling and flow from reset, operating systems; hardware implementation of an addressing map; bus interface and memory timing; state-of-the art microprocessors: features and characteristics. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 3140U.

ENGR 3530U Safety and Quality Management. Nuclear safety management: legal framework, regulatory environment, licensing process; safety culture; defence in depth; reliability concepts; investigating and reporting incidents; emergency procedures; quality assurance; total quality management: organizational structure, policies and procedures, interfaces, grading of QA processes, deficiencies and corrective actions, verification, competence of personnel, document control and records, ISO qualification process. 3 cr, 3 lec. Credit restriction: RADI 3530U, NUCL 1530U.

ENGR 3570U Environmental Effects of Radiation. Topics include: natural and artificial environmental radiation; units and measurements; biological effects of radiation; maximum permissible public dose, magnitude and frequency; release of radioisotopes to the environment; dispersion in the atmosphere; dispersion in aquatic environment; food chain; calculation of total dose consequence; site demographic, meteorological, geologic, hydrologic and seismic characteristics; derived emission limits; radiation dose due to the nuclear fuel cycle; As Low As Reasonably Achievable (ALARA) principle; emergency preparedness; on-site and off-site emergency procedures. 3 cr, 3 lec, 2 lab (biweekly). Prerequisites: ENGR 2950U or RADI 2100U, RADI 2110U.

ENGR 3650U Software Design and Architectures. Engineering design phase of software development: software architectural styles, static and dynamic mid-level object-oriented design concepts (UML class, interaction, and state models), and low-level design modeling. Course emphasizes the Unified Modelling Language (UML) and use of design patterns like broker, generator, reactor design patterns, etc. 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 2490U, ENGR 2720U.

ENGR 3700U Data Management Systems. Mass storage devices; principles of file systems; relational, object oriented, and object relational models, information retrieval. Structured query language, object oriented query language; accessing databases from modern programming languages; compression and handling of large data objects; management of database systems; data mining principles. Data representation with mark-up languages, correctness and parsing. 3 cr, 3 lec, 2 lab. Prerequisites: ENGR 2720U, ENGR 3770U.

ENGR 3720U Introduction to Artificial Intelligence. This course introduces students to basic concepts and methods of artificial intelligence from a software engineering perspective. Emphasis of the course will be on the selection of data representations and algorithms useful in the design and implementation of intelligent systems. Knowledge representation methods, state space search strategies, and use of logic for problem solving. Applications chosen from among expert systems, planning, natural language understanding, uncertainty reasoning, machine learning, and robotics. The course will contain an overview of one AI language and discussion of important applications of artificial intelligence methodology. 3 cr, 3 lec, 3 tut. Prerequisites: ENGR 2715U, ENGR 3650U. Corequisite: ENGR 3770U.

ENGR 3730U Solar Energy Technologies. Incidence, absorption, reflection and re-radiation of sunlight; spectral characteristics and material properties for absorption and radiation of sunlight; fundamentals of photovoltaic generation, typical materials used in solar cells; design, operation and maintenance of photovoltaic systems; design of solar cells, current conversion and conditioning, storage and distribution of electricity in solar systems; concentrating solar systems; design and operation of solar hot water and space heating systems, including energy storage devices for these systems. 3 cr, 3 lec, 2 lab (biweekly). Prerequisite: ENGR 3260U.

ENGR 3740U Scientific Instrumentation. This course is designed to instruct students how to select, use and analyze the appropriate sensor technology (transducers) for measurements related to nuclear technology. In the course the student will learn how to perform experimental data analysis, how various components of sensing devices inter-relate (for example, relationships between amplifiers, transformers, filters, etc), the operating principles of transducers for physical measurements, including, but not limited to: ionizing radiation, displacement and area, pressure, flow, temperature, force, torque, strain, motion, vibration, and air pollution. The student will learn both analog and digital techniques for data analysis, including multiplexing, data conversion and error detection and correction. The laboratory exercises will give the student hands-on experience designing measurement systems. Proper data reporting techniques will also be emphasized. 3 cr, 3 lec, 3 lab (biweekly), 1 tut. Prerequisites: ENGR 2790U, STAT 2800U.

ENGR 3770U Design and Analysis of Algorithms. Designing and analyzing algorithms; asymptotic notation; recurrences and recursion; probabilistic analysis and randomized algorithms; sort algorithms; priority queues; medians and order statistics; data and advanced data structures; augmenting data structures for custom applications; dynamic programming; greedy algorithms; graph algorithms; sorting networks; matrix operations; linear programming; number theoretic algorithms; string matching; NP-completeness and approximation algorithms; object libraries. 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 2110U, ENGR 2715U, MATH 1850U.

ENGR 3820U Nuclear Reactor Kinetics. An introduction to the basic principles of nuclear reactor kinetics and nuclear reactor control. Topics include: neutron cycle; reactor period; prompt and delayed neutrons; source neutron effects; sub-critical, critical and supercritical reactor; point reactor model; thermal power and neutron power; fission product poisoning; Xenon override capability; fresh and equilibrium fuel characteristics; reactivity effects of temperature changes and coolant voiding; reactivity control; approach to critical; reactor stability; spatial flux and power distribution. Reactor simulators will be used to illustrate the key principles being taught. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 2500U, MATH 2860U or ENGR 0103U.

ENGR 3830U Wind Energy Systems. Availability and characteristics of wind energy; location of individual generators and wind farms; wind turbine designs for maximum range of wind speeds and electrical outputs; design of associated mechanical and electrical systems; characteristics of energy storage devices for wind energy systems; operation and maintenance of wind generators; design aspects to minimize environmental impact, construction and operating costs; wind turbine and system designs to meet the needs of the bulk electric system. 3 cr, 3 lec, 1 tut. Prerequisite: ENGR 2010U or ENGR 2320U or ENGR 2640U.

ENGR 3840U Fuel Cell Design. Principles and current state of fuel cell technologies;fuel cell thermodynamics; transport processes; electrochemistry; reliability and efficiency; fuel cell systems and areas of applications; design of various fuel cell types, including Phosphoric Acid Fuel Cells, Alkaline Fuel Cells, Proton Exchange Membrane, Molten Carbonate Fuel Cells, Solid Oxide Fuel Cells, Direct Methanol Fuel Cells. 3 cr, 3 lec, 2 lab (biweekly). Prerequisite: ENGR 2010U or ENGR 2320U or ENGR 2640U.

ENGR 3860U Introduction to Nuclear Reactor Technology. This course is designed to provide the radiation science student with a working background in nuclear reactor technology, so that they may be prepared to work in and around nuclear fission (or fusion) reactors. The emphasis of the course is on health physics and radiation protection aspects of the nuclear fuel cycle. Elementary reactor operation will be covered in sufficient detail to allow the student to have a working knowledge of where radiation hazards are produced, and what controls can be used to minimize the hazards. Nuclear reactor safety and control systems will be covered, and the inherent safety of the CANDU design will be described, and compared with other common light water reactor designs such as PWR, BWR, RBMK etc. 3 cr, 3 lec, 2 tut (biweekly). Prerequisite: PHY 1020U. Credit restriction: ENGR 4640U.

ENGR 3930U Heat Transfer. Introduction to conduction, convection and radiation. Solutions to steady-state and transient conduction problems. Heat conduction across contact surfaces and cylindrical walls. Heat generation in conduction. Solutions to convection problems for laminar and for turbulent flows. Forced and natural convection. Boiling and condensing heat transfer. Two phase flow in a channel. Critical heat flux. Heat exchangers, and heat exchanger effectiveness and operational characteristics. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisite: ENGR 2010U or ENGR 2320U or ENGR 2640U.

ENGR 3950U Operating Systems. The organization and structure of modern operating systems and concurrent programming concepts. Context within which the operating system functions (hardware, other system programs, application programs, interactive users), internals and design issues, design trade-offs and decisions. Process description and control. Threads, SMP, microkernels. Concurrency: mutual exclusion and synchronization. Deadlocks and starvation. Memory management and virtual memory. Uniprocessor scheduling. Multiprocessor and real-time scheduling. I/O management and disk scheduling. File management. Introduction to distributed processing and client/ server computing, distributed process management. Security, performance, and protection. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 1200U.

ENGR 3960U Programming Languages and Compilers. Modern operating systems: large scale distributed to small real-time operating systems; microcomputer/ mainframe interconnections; message passing techniques; networks; distributed deadlocks and shared memory models; extended file systems and shared resources; grid computing and high-performance computing add-ons to operating systems; reliability and failover mechanisms, advanced topics in operating system management. 3 cr, 3 lec, 3 tut. Prerequisites: ENGR 2720U, ENGR 3770U.

ENGR 3980U Software Quality. Processes, methods and techniques for developing quality software, for assessing software quality, and for maintaining the quality of software. Software testing at the unit, module, subsystem and system levels, automatic and manual techniques for generating and validating test data, the testing process, static vs. dynamic analysis, functional testing, inspections and reliability assessment. Tradeoffs between software cost, schedule, time, and quality, integration of quality into the software development process as well as the principles of test planning and test execution. Process awareness, capability maturity. 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 2490U, ENGR 3650U.

ENGR 4010U Vehicle Dynamics and Control. Total vehicle dynamics; dynamical properties of vehicle parts; the longitudinal, lateral and vertical dynamics; mathematical models of vehicles to predict their road performance; selection of important powertrain parameters (e.g. transmission characteristics) to coordinate the requirements of tractive performance and fuel economy; suppression of forces, moments, and movements under external road disturbances; steady-state handling and vehicle directional behaviour; transient response and stability in small disturbance maneuvers; nonlinear effects in tire modelling, classification and analysis of suspension systems; ride quality; driving stability; important vehicle standards and safety regulations and standards examined from vehicle dynamic point of view; vehicle control factors such as driver modelling, occupant comfort and driver interfaces; introduction to active suspension systems, traction control, and yawmoment control; introduction to advanced vehicle control systems for intelligent vehicle-highway systems. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 3210U, ENGR 4260U.

ENGR 4015U Reliability and Maintenance. Introduction to life-cycle costing for equipment acquisition, operation, and replacement decision making; designing for reliability and determination of optimal maintenance and replacement policies for both capital equipment and components. Topics include: identification of an item's failure distribution and reliability function; reliability of series, parallel and redundant systems design configurations; time to- repair and maintainability function; age and block replacement policies for components; the economic life model for capital equipment; provisioning of spare parts. 3 cr, 3 lec, 1 tut. Prerequisite: STAT 2800U.

ENGR 4045U Quality Control. Quality improvement and productivity; quality costs, total quality management; statistical process control; control of incoming material, control charts for attribute and variable data, process capability. Process optimization and design of experiments; screening methods, fractional factorial experiments, Taguchi methods, empirical regression models; acceptance sampling. 3 cr, 3 lec, 1 tut. Prerequisite: STAT 2800U.

ENGR 4060U Automotive Structural Design. This course focuses on design, analysis and manufacture of vehicle's structure. Students will learn about the fundamental design aspect in different categories of vehicles and practice design procedures useful for different vehicle structures. The various manufacturing and assembly techniques used in production of the vehicle structure will be introduced. The course contents include a review of fundamental vehicle loads and their estimation, terminology and overview of vehicle structure types including Body-On-Chassis, Ladder Frame, Grillage Frame, Backbone, Monocoque, Space frame, and unitary body structures, torsion and bending stiffness, Stiffness optimization, fatigue analysis, Design and analysis of body subassemblies and model variants, sizing of sections and joints, Engineering Materials and their incorporation into vehicle design, Material property charts, Material selection, Auto body design, Crashworthiness and its influence on vehicle design. 3cr, 3 lec, 2 tut. Prerequisites: ENGR 3010U, ENGR 3220U.

ENGR 4070U Chassis Systems Design. This course is designed to introduce the students to fundamentals of typical design methods and procedures of automotive vehicle chassis including sub-systems of steering mechanisms, suspensions, and brakes. The student will develop the ability to design typical chassis constructional arrangements and the sub-systems through selecting appropriate constructions and determining basic parameters based on design principles, physical laws, standards, design criteria and constraints. The students will learn basic approaches for evaluating vehicle chassis and corresponding sub-systems based on constructional and functional design analysis. Some design experience will be gained by completing required design projects. 3cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 3010U, ENGR 3270U.

ENGR 4075U Special Topics in Automotive Engineering. Contemporary topics at the advanced undergraduate level. Faculty presents advanced elective topics not included in the established curriculum. 3 cr, 3 lec. Prerequisite: Permission of the instructor.

ENGR 4080U Automotive Systems Design I. This course constitutes the first part of a two term design endeavour which will culminate in ENGR 4081U Automotive Systems Design II. It covers design considerations for automotive systems. Students will learn the automotive product development process. The increasing complexity of automotive systems and the pressure to deliver these systems to market faster is driving the need for better engineering design approaches to product development. Students work in small groups and complete a series of assignments building to the development of an automotive system. By the end of this course students will have completed the following parts of the design process to cover the fundamentals of vehicle design: customer requirements; background search; design plan and project management; brainstorming; preliminary concept generation: sketching ideas; engineering specifications (benchmarking); detailed concept generation; functional decomposition; concept development and screening/ selection; preliminary project presentation; preliminary design report; and preliminary vehicle design proof-of-concept demonstration. 3 cr, 3 lec, 3 lab. Prerequisite: Successful completion of all non-elective courses in year three, i.e. ENGR 3030U, ENGR 3190U, ENGR 3270U, ENGR 3350U, ENGR 4260U, ENGR 3000U, ENGR 3210U, ENGR 3220U, ENGR 3320U, ENGR 3360U or BUSI 1700U, ENGR 3450U.

ENGR 4081U Automotive Systems Design II. In this course, students will complete the design and development of the vehicle they started in ENGR 4080U Automotive Systems Design I. By the end of this course students will have completed the following parts of the design process for their vehicles: Design Refinements based on findings from proof-of-concept prototype; detailed design and engineering analysis; test plan; test results and product validation; final project presentation; final project report; and prototype system demonstration. 3 cr, 1 tut, 3 lab. Prerequisite: ENGR 4080U.

ENGR 4100U Modern Control Systems. Mathematical models of systems: differential equations and linear approximations of physical systems; open- and closed-loop control systems: parameter variations, steady-state error, sensitivity analysis; performance of feedback control systems: time-domain performance specifications, transient response, and steady state error; stability analysis: Nyquist and Routh-Hurwitz criterion; frequency response methods; stability in the frequency domain; time domain analysis of control systems. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 3110U. Credit restriction: ENGR 3100U. Note: This course is offered only to students who have completed their third year of the Electrical Engineering program by September 2009. This course will not be offered after the 2010-2011 academic year.

ENGR 4110U Power Systems. First, various means of electric power generation-through hydroelectric, thermoelectric, geothermal, wind, solar, and nuclear sources-are highlighted, and the choice of a given source-dictated by economic and environmental factors, application requirements and cost drivers is discussed. Then the course focuses on electric power systems; mainly electric power generation transmission, distribution; planning and operating inter-connected power systems; operating strategies and economic dispatch; transmission power line parameters, transformer models, symmetrical components, power system modelling, power flow on transmission lines; power system fault analysis. 3 cr, 4 lec, 2 tut (biweekly). Prerequisite: ENGR 3250U.

ENGR 4120U Introduction to Power Electronics. This course covers fundamentals of power conversion techniques: Review of semi-conductor switches, review of basic electrical and magnetic circuits, single-phase and three phase rectifier and inverter circuits, switch mode converters and power supplies, control of switch-mode dc power supplies, snubber circuit design, computer simulation of power electronic converters and systems using EMTP RV. 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 3100U, ENGR 3230U, ENGR 3250U.

ENGR 4130U Digital Communications. Digital Communications covers optimum receiver principles: AWGN, geometric representation of signals, maximum likelihood criterion and optimum decision regions, correlation receivers and matched filters, probability of error and union bound; digital bandpass modulation (FSK, PSK, QAM), baseband systems; performance comparisons: bit error rate, bandwidth, power, complexity; adaptive equalization techniques and algorithms; carrier and symbol synchronization; fundamental limits in information theory: entropy and the source coding theorem; channel capacity and the channel coding theorem; information capacity theorem and design trade-offs. 3 cr, 3 lec, 2 tut. Prerequisite: ENGR 3070, ENGR 3130U.

ENGR 4140U Power System Protection Relaying. Need for protection systems, types of relays, operating principles and relay construction, overcurrent protection, distance protection, pilot relaying schemes, ac machines and Bus protection, micro-processor and interfacing, micro-processor based relays, Overvoltage protection. 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 3230U, ENGR 3250U, ENGR 3100U.

ENGR 4150U Advanced Control Systems. Modelling of systems: from State Space (SS) to Discrete Event (DE) to Transfer Function (TF). Introduction to SISO and MIMO systems. Co-ordinate transformations of SS models. Linearization of nonlinear systems. Lyapunov stability theorems. Explicit solutions to the DE for linear time-invariant (LTI) systems (and properties of these solutions.) Notions of controllability and observability. Kalman decomposition. Controller synthesis: feedforward control, pole assignment, optimal control (LQR). Observer design. 3 cr, 3 lec, 2 tut. Prerequisite: ENGR 3100U.

ENGR 4160U Artificial Intelligence in Engineering. Introduction to artificial intelligence; knowledge-based systems, state space representation, search strategies, knowledge representation, reasoning with uncertainty; fuzzy sets, membership functions and operations, fuzzy relations, fuzzy reasoning; neural networks, basic neuron modelling, multi-layer perceptron, self-organization networks and adaptive theory; genetic algorithms for optimization and search; applications of artificial intelligence in engineering, design and manufacturing. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 3350U, MATH 2070U.

ENGR 4180U Special Topics in Electrical Engineering. Contemporary topics at the advanced undergraduate level. Faculty presents advanced elective topics not included in the established curriculum. 3 cr, 3 lec. Prerequisite: Permission of the instructor.

ENGR 4190U Multimedia Systems. Theory, features, design, performance, complexity analysis and application of multimedia engineering technologies; digital signal compression: audio, image, video, characterization, compression requirements; source entropy and hybrid coding, transform and wavelet based coding; motion estimation; object-based processing, and multimedia indexing and retrieval. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 3110U.

ENGR 4210U Advanced Solid Mechanics and Stress Analysis. Three-dimensional stress analysis; strain energy; energy methods; finite element method; asymmetric and curved beams, superposition of beam solutions, beams on elastic foundations; plate bending; buckling, including Euler's formulae for buckling; eccentric loading; fracture mechanics; fatigue. 3 cr, 4 lec, 2 lab (biweekly), 1 tut. Prerequisite: ENGR 2260U or ENGR 2420U.

ENGR 4220U Mechanical Systems Design I. This course constitutes the first part of a two term design endeavour which will culminate in ENGR 4221U Mechanical Systems Design II. It covers design considerations for systems that predominantly incorporate mechanical components. The engineering design process will be reviewed along with its application to the design of mechanical systems. Students will work in small groups on a project of major breadth that will require them to integrate the knowledge that they have gained throughout their course of study and apply it to the design and development of a complete predominantly mechanical system. By the end of this course students will have completed the following parts of the design process for their projects: customer requirements; background search; design plan and project management; brainstorming; preliminary concept generation: sketching ideas; engineering specifications (benchmarking); detailed concept generation: functional decomposition; concept development and screening/selection; preliminary project presentation; preliminary design report; and proof-of-concept prototype demonstration. 3 cr, 3 lec, 3 lab. Prerequisite: Successful completion of all non-elective courses in year three, i.e. ENGR 3030U, ENGR 3190U, ENGR 3270U, ENGR 3350U, ENGR 3210U, ENGR 3220U, ENGR 3360U or BUSI 1700U, ENGR 3390U, ENGR 3930U.

ENGR 4221U Mechanical Systems Design II. In this course, students will complete the design and development of the system that they first started in ENGR 4220U Mechanical Systems Design I. By the end of this course students will have completed the following parts of the design process for their projects: design refinements based on findings from proof-of-concept prototype; detailed design and engineering analysis; test plan; test results and product validation; final project presentation; final project report; and prototype system demonstration. 3 cr, 1 tut, 3 lab. Prerequisite: ENGR 4220U.

ENGR 4230U Thermofluids and Energy Systems Design I. This course constitutes the first part of a two term design endeavour which will culminate in ENGR 4231U Thermofluids and Energy Systems Design II. It covers the science and morphology of design as applied to thermal, fluids and energy processes and systems. Design criteria include energy efficiency, environmental impact, economics etc. Students work in small groups of three or four on thermofluids and energy systems processes or component projects in which they integrate the principles of fluid mechanics, thermodynamics and heat transfer into designs. The project topics are in thermofluids and energy systems area such as heat exchangers, cooling towers, combustion systems, power plant systems, air conditioning systems, heat pumps, pipe networks, design and selection of pumps, blowers, compressors etc. By the end of this course the students will have completed the following parts of their project: customer requirements; background search; design and analysis plan; brainstorming; preliminary project presentation; preliminary design report. 3 cr, 3 lec, 2 tut. Prerequisites: Successful completion of all non-elective courses in year three, i.e. ENGR 3030U, ENGR 3190U, ENGR 3260U, ENGR 3350U, ENGR 3320U, ENGR 3360U or BUSI 1700U, ENGR 3450U, ENGR 3930U, ENGR 4240U.

ENGR 4231U Thermofluids and Energy Systems Design II. In this course, students will complete the analysis, design and development of the thermofluids and energy systems process or component they first started in ENGR 4230U Thermofluids and Energy Systems Design I. Students will work to complete design report for the process or component and depending on the scope of the project and financial support they will work to develop a model of this in the laboratory. By the end of this course the students will have to come up with the design of the process or component; validation; final project presentation; final project report. 3 cr, 1 tut, 3 lab. Prerequisite: ENGR 4230U.

ENGR 4240U Applied Thermal and Fluids Engineering. This course incorporates the fundamental principles of thermodynamics and fluid mechanics to engineering applications. Topics covered include refrigeration; heating, ventilating and air conditioning; heat engine cycles, including the Rankine cycle; combustion; pipe networks; flow transients, including water hammer; open channel and free surface flows; flow machines including pumps, turbines and propellers. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 2320U, or ENGR 2640U, ENGR 2860U.

ENGR 4250U Advanced Materials Engineering. Methodology of materials selection; evaluation of property data; materials testing; tensile properties, hardness, impact properties, fatigue, creep; failure and modes of fracture; interrelationships of structure, properties and processing; structural modifications in metals, ceramics and composite materials; strengthening mechanisms; heat treatment; processing and applications of engineering materials; introduction to electron microscopy, x-ray diffraction, and mass spectrometry. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 2220U, ENGR 2260U or ENGR 2420U.

ENGR 4260U Automotive Engineering. Technical systems and related engineering aspects of vehicles are covered with a focus on how they pertain to vehicle design, analysis, and performance development. Topics covered include: engine design for robustness, performance and emissions compliance. Layout of the powertrain, engine torque and the influence of traction on driveability are discussed. Mechanics and properties of road-tires of the camber and caster, cornering, steady-state handling as they relate to suspension and steering design, ride comfort, handling and performance objectives are studied. Static and dynamic weight transfer, accelerating and braking, rolling resistance, aerodynamic influence, vehicle road load, and the proving ground testing of vehicles are covered. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 2020U or ENGR 2430U, ENGR 3350U.

ENGR 4280U Robotics and Automation. Industrial robots; robot kinematics, differential kinematics; statics, dynamics and control of robot arms; noncontact and contact sensors; actuators; real-time joint control; task planning and programming of industrial robots; applications of robots. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisite: ENGR 3390U.

ENGR 4290U Finite Element Methods. This course covers the theoretical and computational principles of the finite element method, including geometrical modelling, materials modelling, and discrete element formulation of flexible structures (bars, beams, frames, plates and shells). An introduction to nonlinear finite element analysis, modelling, errors and accuracy, and assembly of global matrices will be addressed. Students will have the opportunity to utilize commercially available software to solve various engineering problems. They will obtain experience with mesh generation, material property specifications, load applications, boundary condition applications, solution methods and interpretation of results. Applications will include 2-D and 3-D stress analysis and steady-state thermo-fluid applications. 3 cr, 3 lec, 2 tut. Prerequisite: ENGR 2420U or ENGR 3030U.

ENGR 4310U Electronics. The focus of this course is the analysis and design of electronic circuits, semiconductors, fundamental characteristics, modes of operation, and types of diodes, bipolar junction transistors, field-effect transistors; nonlinear circuit applications: small signals and rectifiers; transistor biasing and amplifiers; integrated circuits: fabrication and characteristics. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 3330U, ENGR 3390U.

ENGR 4320U Advanced Mechatronics. The focus of this course is to provide the tools required to design, model, analyze and control mechatronics systems. Modelling of various system components into a unified approach and tools for the simulation of the performance of these systems; characteristics of typical mechatronics systems in terms of their impacts on enhancement of performance, speed of operation, and physical size; applications of mechatronics to robotics and automation industry, and other intelligent systems. 3 cr, 3 lec, 3 lab. Prerequisites: ENGR 3330U, ENGR 3390U, ENGR 4350U.

ENGR 4330U Mechatronic Systems Design I. This course constitutes the first part of a two term design endeavour which will culminate in ENGR 4331U Mechatronic Systems Design II. It covers design considerations for systems that incorporate mechatronic components. The engineering design process will be reviewed along with its application to the design of mechatronic systems. Students will work in small groups on a project of major breadth that will require them to integrate the knowledge that they have gained throughout their course of study and apply it to the design and development of a complete mechatronic system. By the end of this course students will have completed the following parts of the design process for their projects: customer requirements; background search; design plan and project management; brainstorming; preliminary concept generation: sketching ideas; engineering specifications (benchmarking); detailed concept generation: functional decomposition; concept development and screening/selection; preliminary project presentation; preliminary design report; and proof of concept prototype demonstration. 3 cr, 3 lec, 3 lab. Prerequisite: Successful completion of all non-elective courses in year three, i.e. ENGR 3030U, ENGR 3190U, ENGR 3270U, ENGR 3350U, ENGR 3320U, ENGR 3330U, ENGR 3390U.

ENGR 4331U Mechatronic Systems Design II. In this course, students will complete the design and development of the system that they first started in ENGR 4330U Mechatronic Systems Design I. By the end of this course students will have completed the following parts of the design process for their projects: design refinements based on findings from proof-of-concept prototype; detailed design and engineering analysis; test plan; test results and product validation; final project presentation; final project report; and prototype system demonstration. 3 cr, 1 tut, 3 lab. Prerequisite: ENGR 4330U.

ENGR 4350U Microprocessors. Number systems, architecture, instructions, and subroutines; algorithms; memory; PIA; interrupts and timers; transistors; binary interfaces; conversion of A/D and D/A; stepper motors; dc motors; z-transform; breadboard integration; steady state analysis and component ratings; control loop design and control loop modelling. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisites: ENGR 3350U, ENGR 3390U.

ENGR 4380U Life Cycle Engineering. The course introduces the fundamentals of both product and process engineering with an emphasis on life cycle models. A mixture of practical and theoretical topics, methodologies, principles, and techniques of life cycle engineering are covered such as design reviews, re-engineering, mass customization, product modularity, cost/benefit analysis, value engineering, and life-cycle design [e.g. Design for Assembly (DFA), Design for Manufacturing (DFM), Design for Serviceability (DFS), Reliability design etc.]. Students develop an understanding of the performance, cost, and environmental implications of both product design and manufacture and become capable of translating these into engineering "cradle-to-grave" responsibility requirements, goals, and specifications in order to maximize the values of products and the effectiveness of supply chain management while containing the costs to the manufacturer, the user, and society. Energy utilization is considered throughout along with energy-related life cycle methods. 3 cr, 3 lec, 1 tut (biweekly). Prerequisite: ENGR 3030U.

ENGR 4390U Modelling Manufacturing Systems. Queuing theory; production scheduling; modelling of production systems; discrete event simulation languages and programming; discrete event simulation software for manufacturing; production process scheduling; capacity planning; analytic rapid modelling; facility simulation. 3 cr, 4 lec, 2 lab. Prerequisite: ENGR 3300U.

ENGR 4395U Manufacturing Systems Design I. This course constitutes the first part of a two term design endeavour which will culminate in ENGR 4396U Manufacturing Systems Design II. It covers the concepts for product design using the principles of concurrent engineering, design for assembly, environmentally conscious design and public safety issues while also addressing the relevant manufacturing and the competitive aspects of manufacturing the product. The students will work in small groups on a project of sufficient breadth that will require integration of the knowledge acquired throughout their courses in the previous years. By the end of this course students will have completed the following parts of the design process for their projects: customer requirements; background search; design plan and project management; brainstorming; preliminary concept generation: sketching ideas; engineering specifications (benchmarking); detailed concept generation: functional decomposition; concept development and screening/selection; preliminary project presentation; preliminary design report; and proof-of-concept prototype demonstration. The students will complete the design and development of their projects in part II of the course; ENGR 4396. 3 cr, 3 lec, 3 lab. Prerequisite: Successful completion of all non-elective courses in year three, i.e. ENGR 3030U, ENGR 3190U, ENGR 3270U, ENGR 3350U, ENGR 3360U or BUSI 1700U, ENGR 3300U, ENGR 3390U, ENGR 3460U, ENGR 4045U.

ENGR 4396U Manufacturing Systems Design II. In this course, students will complete the design and development of the system that they first started in ENGR 4395U Manufacturing Systems Design I. By the end of this course students will have completed the following parts of the design process for their projects: design refinements based on findings from proof-of-concept prototype; detailed design and engineering analysis; test plan; test results and product validation; final project presentation; final project report; and prototype system demonstration. 3 cr, 1 tut, 3 lab. Prerequisite: ENGR 4395U.

ENGR 4410U Fossil Fuel Energy Conversion. Electrical systems loads, peaks, reliability. Types of fossil fuelled power plants. Complex Rankine and Brayton cycles. Combined-cycle power plants. Cogeneration and trigeneration. Efficiencies, irreversibilities and losses. Steam supply systems: coal firing systems; steam generator types; steam plant efficiencies; heat transfer and thermal transport in fossil fuel fired steam generators. Steam turbines: impulse and reaction blading; mechanical design of turbine components and operational considerations; efficiencies. Gas turbines: gas path design; heat balance and efficiency determination; performance analysis of actual power plant turbines; design aspects. Fans, centrifugal and axial-flow compressors, and their design. Auxiliary power plant equipment: heat exchangers, fuel preparation, water treatment, cooling equipment. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisite: ENGR 3260U.

ENGR 4420U DSP Theory and Design. Review of Linear Time-Invariant (LTI) systems and Z-transform, sampling and quantization of low-pass and bandpass continuous-time signals, Fourier analysis of LTI systems, block diagram representation of LTI systems, finite word-length arithmetic and noise; design and realization of digital filters: Finite-Impulse Response (FIR) and Infinite-Impulse Response (IIR), Discrete Fourier Transform (DFT). Fast Fourier Transform (FFT), Digital Signal Processing (DSP) applications in communications, multimedia and engineering. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 3110U.

ENGR 4430U Sustainable and Alternative Energy Technologies. Descriptions of systems and design issues and parameters, including performance, operating characteristics, reliability. Small-scale hydraulic energy. Tidal and wave energy. Solar energy systems, including photovoltaics and thermal systems. Wind energy systems. Biomass energy. District energy. Hydrogen energy systems, including production, storage, transport and utilization technologies. Fuel cells: fundamentals such as fuel cell thermodynamics, electrode kinetics; and types, including proton exchange membrane and solid oxide fuel cells. Energy storage, including thermal, compressed air and battery storage. Geothermal energy systems. Magnetohydrodynamics, thermoelectrics, thermionics. Future directions. 3 cr, 3 lec, 2 lab (biweekly). Prerequisite: ENGR 4240U.

ENGR 4440U Advanced Power Generation. Fundamental and applied aspects of nuclear engineering: structure of the nucleus; nuclear stability and radioactive decay; interaction of radiation with matter including radiological health hazards; interaction of neutrons including cross-sections, flux, moderation, fission, neutron diffusion and criticality; engineering of nuclear reactors; reactor start-up, shut down and refuelling; reactor systems including CANDU and U.S. reactors, and gas-cooled and breeder reactors; reactor accidents, fuel cycles and waste disposal. Fusion. Hydroelectric power generation: turbines and other components, water reservoirs, pumped energy storage. Aircraft gas turbine engines, including turbojets and turbofans; intakes, nozzles; aero-derivative gas turbines for terrestrial applications. 3 cr, 4 lec, 1 tut. Prerequisite: ENGR 4240U.

ENGR 4450U Thermal Environmental Engineering. Heating, ventilating, air conditioning and refrigeration. Psychrometrics and psychrometric processes. Sensible heating and cooling, cooling and dehumidification, mixing and humidification. Ventilation and room air distribution. Human comfort. Indoor air quality. Refrigeration and refrigeration systems. Design of air conditioning and heating systems. Equipment selection. Duct and fan design. Pump and piping design. Energy management in buildings. 3 cr, 3 lec, 2 lab (biweekly), 1 tut. Prerequisite: ENGR 4240U.

ENGR 4460U Nuclear Power Systems. Principles of fission; nuclear fuels; thermal and fast reactors; converters and breeders; light water reactors; heavy water reactors, gas cooled reactors; direct and indirect cycle nuclear plants; unit control strategies; nuclear plant safety; fuel cycles; plant decommissioning; waste management; environmental effects; life-cycle costs. Principles of fusion reactors; experimental fusion facilities. 3 cr, 3 lec. Prerequisite: PHY 1020U.

ENGR 4470U Hydrogen Power Systems. Potential benefits of the hydrogen economy; hydrogen production by reforming and by electrolysis; storage methods, including compressed gas, liquid hydrogen, metal hydride, graphite, iron sponge; minimizing combustion and explosion hazards; applications in transportation, small and large scale stationary power applications; integrated energy systems using hydrogen as the key energy carrier. 3 cr, 3 lec. Prerequisite: ENGR 3840U.

ENGR 4480U Emerging Energy Systems. This course will examine recent advances in energy systems, including fossil, nuclear, solar, wind, biomass, municipal waste, geothermal, tidal and wave energy; new energy sources, methods of conversion, transportation, storage and disposal will be examined from a systems point of view, and include environmental, economic and political aspects; feasibility of new technologies and significant advances in existing technologies will be examined. 3 cr, 3 lec. Prerequisite: ENGR 3260U.

ENGR 4500U Wireless Communications. Digital wireless phones, cordless phones, and wireless data; the first and second generation wireless mobile cellular network standards; characteristics of wireless propagation channels, including slow and fast fading, Doppler shift, multipath delay spread; bandpass transmission over wireless channels; digital modulation over wireless channels; wireless channel impairment mitigation techniques; fundamental of cellular communication concept, including cellular traffic and layout, frequency reuse, co-channel and adjacent channel interferences, call-processing, hand-off process; Multiple access techniques, including Frequency Division Multiple Access (FDMA)/ Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA), Orthogonal Frequency Division Multiplexing (OFDM). 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 3070, ENGR 3130U.

ENGR 4510U Nuclear Plant Chemistry (formerly ENGR 3510U). Corrosion and crud formation; heavy water chemistry; heavy water production and upkeep; moderator and heat transport system chemistry; purification systems to remove particulates, contaminants and chemicals added to control reactivity; decontamination; steam generator, condenser and feedwater chemistry; pH and pD control in power plants; online and offline control of process chemistry; metallurgical problems in nuclear power plants; metallurgical techniques for irradiated materials. 3 cr, 3 lec. Prerequisite: CHEM 1800U or CHEM 1020U. Note: Elective for nuclear engineering programs.

ENGR 4520U Nuclear Plant Safety Design. This course describes the regulatory requirements and the principles guiding the protection of workers and the general public from being harmed as a result of nuclear plant operations. Topics include: worker and public safety requirements; codes and standards; sources of radioactive release; defence in depth; principle of control, cool, contain; accident prevention, mitigation and accommodation; separation and independence; redundancy; common mode events; inherent safety features; plant safety systems; safety culture, management of plant safety; design basis accident; accident analysis; quantitative and probabilistic risk assessment; examples of nuclear accidents; online and off-line computer codes for the design and safety analysis of nuclear plants. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 4640U, ENGR 4660U, ENGR 4700U.

ENGR 4530U Hydroelectric Power Systems. Principles of hydroelectric energy conversion; design of dams and reservoirs; run-of-river plants; design of hydroelectric turbine-generators; AC and DC generators; mini- and micro-hydro generators; operating and maintenance aspects; special uses as spinning reserves and for frequency control of the bulk electric system; pumped-storage; environmental impacts. 3 cr, 3 lec. Prerequisites: ENGR 2360U, ENGR 3260U.

ENGR 4540U Energy Efficiency, Management and Simulation. Exergy analysis and other second-law analysis methodologies: theoretical foundations, exergy efficiencies and losses, applications to devices and systems; use in efficiency improvement and design. Energy management: energy control and usage strategies, energy economics, energy audits, energy conservation strategies, design for energy improved management. Simulation and computational methods for energy and thermofluids systems: Conservation and energy equations; finite difference and element methods; one- and two-dimensional steady and unsteady problems; computational fluid dynamics; use of simulation in energy systems design. 3 cr, 3 lec, 1 tut. Prerequisite: ENGR 4240U.

ENGR 4610U Corrosion for Engineers (formerly ENGR 3610U). A study of types, causes, costs, measurement and prevention of corrosion. Topics include: effects of material choices and the environment; types of corrosion discussed: general or uniform, galvanic, crevice, pitting, intergranular, selective leaching, stress-corrosion, erosion-corrosion, hydrogen effects; corrosion testing; selection of materials; aqueous corrosion; high temperature corrosion; corrosion in nuclear and fossil plants and other industrial environments; electrochemical principles; thermodynamics; electrode kinetics; aqueous corrosion kinetics; practical applications. 3 cr, 3 lec, 1 tut. Prerequisite: CHEM 1020U or CHEM 1800U.

ENGR 4620U Radioactive Waste Management Design (formerly ENGR 3640U). Students will study: nature of radioactive waste; origin of low, intermediate and high activity waste; characteristics, forms and quantity of radioactive waste; production of radioactive waste at each stage of the nuclear cycle: mining, fuel fabrication, reactor operation and maintenance, spent fuel, reactor structural components; medical and industrial waste; handling, transporting, storing and disposing technologies for each type of waste; on-site and off-site storage; spent fuel reprocessing and disposal methods; radioactive waste management plans and practices in various countries; public concerns and perception of radioactive waste management. Two field trips will be arranged. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 3570U, ENGR 3930U, ENGR 4610U.

ENGR 4640U Nuclear Plant Operation. A combination of lectures and self-paced interactive CD-ROM study will introduce students to the principles of energy conversion, to the operating features of the main nuclear reactor types, the use of pressure vessels and pressure tubes, natural versus enriched fuel, moderators, reactor coolant systems, steam turbines and associated water systems, generators, transformers, electrical output and plant electrical systems, grid frequency and voltage control, reactor following-turbine and turbine-following- reactor unit control systems, turbine generator governing, power maneuvering capability, trips, steam dumping to the condenser, normal and abnormal operating events. 3 cr, 3 lec, 1 tut. Prerequisite: PHY 1020U or ENGR 3820U. Credit restriction: ENGR 3860U.

ENGR 4650U Computer Networks. Network history and architectures; reference Model for Open Systems Interconnection (OSI): descriptions, examples, and applications; bridges, routers, gateways; routing, multicast deliver; TCP/IP protocol suite; network topologies (ring, bus, tree, star, mesh); local area networks, Ethernet, Token passing, wireless LAN, personal LAN, WAN; 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 3140U.

ENGR 4660U Risk Analysis Methods. Students will apply probability theory to discrete and continuous events. Topics include: random variables; decision theory, including Bayes' Theorem, the likelihood principle, prior posterior and predictive distributions and survival models. Students will also study chemical, physical, biological hazards; recognition, evaluation, prevention and control of hazards; industrial hygiene and occupational health; analysis, assessment, characterization and communication of risks. 3 cr, 3 lec, 1 tut. Prerequisite: STAT 2800U.

ENGR 4670U Shielding Design (formerly ENGR 3670U). Radiation sources; characteristics and utilization of various radiation detectors; statistics of radiation counting; radiation spectroscopy with scintillation detector; semi-conductor detectors; identification and measurement of source strength, spectrum and geometry; shielding requirements for various types of radiation; shielding materials for equipment and processes employing radiation; radiation heating; radiation damage; measuring the effectiveness of various shielding materials; shielding for the transportation of radioactive materials; calculation and design of shielding for industrial and power plant applications; shielding requirements for spent fuel storage. 3 cr, 3 lec, 2 lab. Prerequisites: ENGR 2950U, or RADI 2100U, RADI 2110U. Note: Elective for nuclear engineering or radiation science programs.

ENGR 4680U Nuclear Materials (formerly ENGR 3920U). Irradiation effects on material properties, including neutrons, charged particles and gamma radiation; activation products; selection of materials for nuclear applications; radiation induced damage in materials; neutronic, thermal and structural considerations; material properties of nuclear fuels and fuel cladding; pressure vessel and pressure tube material behaviour; moderator, coolant and steam generator material properties; materials suitable for reactivity control device and shielding; materials used for long term storage of radioactive waste and spent fuel; activation analysis of materials using a neutron source. 3 cr, 3 lec. Prerequisites: ENGR 2220U, ENGR 2950U. Note: Elective for nuclear engineering or radiation science programs.

ENGR 4700U Nuclear Plant Design and Simulation. Introduces the main design and operating features of nuclear power plants using pressurized and boiling light water, pressurized heavy water and gas cooled reactors; small, medium and large reactors; unit control schemes; shutdown and safety systems; reactor cooling, shutdown and emergency core cooling systems; steam generator design features, level and pressure control; turbine and generator design; feedwater systems; unit electrical, service water and air systems. Where appropriate, nuclear power plant simulators will be used to demonstrate key aspects of power plant design. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 2010U, ENGR 4640U, ENGR 4780U.

ENGR 4730U Reactor Control. The time and frequency domain performance characterizations of control loops are introduced with consideration of actuator and sensor limitations. Different controller design and tuning methods and instrumentation calibration procedures are discussed. Advanced control technologies, such as distributed control systems are introduced in view of their potential applications in the existing and newly constructed CANDU power plants. Students gain familiarity with the use of indicators and alarms; the role of the operator, man-machine interface design; the use of computers in reactor control; in-core and out-of-core measurement of neutron flux, spatial flux control, start-up instrumentation, failed fuel detection and location; reactivity control methods, mechanisms and algorithms; reactor shutdown methods, mechanisms and systems; loss of reactor control; heat transport system pressure and inventory control. 3 cr, 3 lec. Prerequisite: MATH 2860U or ENGR 0103U.

ENGR 4750U Microwave and RF Circuits. Signal integrity in high-speed digital circuits; wave equation, ideal transmission circuits; transient on transmission lines; planar transmission lines and introduction to MMICs; microwave network analysis; design with scattering parameters; planar power dividers; directional couplers; microwave filters; RF receiver chains; noise; solid-state microwave amplifiers; noise, diode mixers; RF receiver chains, oscillators. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisites: ENGR 3230U, ENGR 3240U.

ENGR 4760U Ethics, Law and Professionalism for Engineers. Legal aspects of engineering practice; business organizations and corporations; intellectual and industrial property; conflict resolution; tort liability and contract law; employment and labour law; public safety and health considerations; occupational health and safety and WHMIS; Canadian and international engineering standards and commercial practices; international trade; environmental laws and regulations; environmental stewardship and sustainable development; corporate social responsibility; equity. Ethics and moral philosophy; applied ethics; ethical aspects of engineering practice; engineering codes of ethics and ethical obligations of engineers; detecting ethical dilemmas and methods for resolving them; research ethics. The engineering profession and its history; engineering associations and societies; engineering licensure; the role and responsibilities of the professional engineer in society; engineers in industry, management and private practice. 3 cr, 3 lec.

ENGR 4780U Nuclear Reactor Design (formerly ENGR 3780U). An introduction to thermal and fast reactors and reactor cooling systems. Topics include: natural and enriched fuels; pressure vessels and pressure tubes; reactor structures; moderator materials and systems; reactor coolant materials and systems; shutdown and safety systems, heat generation and removal in the fuel; modes of heat transfer from fuel to coolant; boiling heat transfer; cooling by natural circulation; measurement of thermal-hydraulic parameters; momentum, mass and energy transfer processes; requirements for main heat transport, shutdown cooling and emergency core cooling systems. Nuclear power plant simulators will be used to demonstrate key aspects of reactor design. 3 cr, 3 lec, 1 tut. Prerequisites: ENGR 2500U, ENGR 2860U, ENGR 3820U, ENGR 3930U, MATH 2070U or MATH 2810U.

ENGR 4790U Distributed Systems. This course exposes the student to the major paradigms of distributed systems. Topics include: Distributed architectures; distributed processing models like client-server and code migration; inter-process communication; distributed naming and directory services; inter-process synchronization; distributed security; fault tolerance; distributed object-based systems; distributed file systems; distributed web-based systems; introduction to distributed coordination systems like peer-to-peer, publish/ subscribe, and GRID services. 3 cr, 3 lec, 2 tut, 3 lab (biweekly). Prerequisites: ENGR 2110U, ENGR 3770U, ENGR 3950U.

ENGR 4800U Advanced Operating Systems. Modern operating systems: large-scale distributed to small real-time operating systems; microcomputer/ mainframe interconnections; message passing techniques; networks; distributed deadlocks and shared memory models; extended file systems and shared resources; grid computing and high-performance computing add-ons to operating systems; reliability and failover mechanisms, advanced topics in operating system management. 3 cr, 3 lec, 2 tut, 3 lab (biweekly). Prerequisite: ENGR 3950U.

ENGR 4810U Nuclear Fuel Cycles. Students study the production of fissile and fertile nuclear fuel; isotope separation; enrichment of uranium; characteristics of fuel-element materials; metal and ceramic uranium fuel; design and fabrication of fuel elements; fuelling strategies; fuel failure mechanisms and detection of failed fuel; properties of irradiated fuel; the role of plutonium; principles of spent fuel reprocessing; dissolution of spent fuel from nuclear reactors; plutonium separation; meeting safe-guards requirements; natural versus slightly enriched fuel cycles; recycling of PWR fuel in CANDU; use of plutonium from the weapons program; thermal breeders; fast breeders. 3 cr, 3 lec. Prerequisite: ENGR 4610U, ENGR 4780U or NUCL 4540U.

ENGR 4820U Modelling and Simulation. This course introduces computer simulation approaches using deterministic and Monte Carlo techniques in systems modelling, including: use of general purpose simulators in systems planning, design, evaluation, and prediction, life cycle of a simulation project, problem formulation, conceptual modeling and modelling techniques, simulation modeling including continuous and discrete event simulations, validation and verification, design of experiments, simulation tools and languages, output data analysis, and also special topics including uncertainty modelling, parallel and distributed simulations. Footprints of the computer simulation can be observed in all science and engineering fields such as transportation, manufacturing, design engineering. 3 cr, 3 lec, 2 tut. Prerequisites: ENGR 3770U, STAT 2800U.

ENGR 4830U Real Time Systems and Control. Computing systems design for real-time applications in control, embedded systems and communications; microcontrollers; data acquisition in robotics and manufacturing, file management, memory management and multitasking in a real-time environment; object-oriented design principles for real-time systems. Robustness. 3 cr, 3 lec, 2 tut, 3 lab (biweekly). Prerequisite: ENGR 3950U.

ENGR 4840U Software and Computer Security. Introduction to software security, managing software security risk, selecting technologies open vs. closed source, principles of software security, auditing software, buffer overflows, access control, authorization and authentication, race conditions, randomness and determinism, applying cryptography, trust management and input validation, law and ethics of IT security, security at the operating system and network level. Firewalls, intrusion detection. 3 cr, 3 lec. Prerequisites: ENGR 4650U, ENGR 4790U.

ENGR 4850U User Interfaces. Principles of human interaction with computers, graphical user interfaces (Windows, Unix), concrete designs and good design principles. Rapid prototyping, evaluation methods for user interfaces, cognitive psychology. Ergonomics, principles of computer graphics, voice recognition, remote instrumentation, immersive environments, virtual reality, and augmented reality. 3 cr, 3 lec, 2 tut. Prerequisite: ENGR 3650U.

ENGR 4860U Computer Graphics Design. The basic concepts, tools and techniques of computer graphics are described, and the fundamental transformations of scaling, translation, rotation, windowing, hidden line removal, image processing and clipping are presented. Mathematical tools needed for the geometrical aspects of computer graphics are discussed. Particular emphasis will be placed on new developments in microcomputer graphics. Students will be expected to develop a graphics application in C++ and/or JAVA in conjunction with available graphics libraries. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisites: ENGR 2110U, ENGR 2710U.

ENGR 4870U Special Topics in Software Engineering. Contemporary topics at the advanced undergraduate level. Faculty presents advanced elective topics not included in the established curriculum. 3 cr, 3 lec. Prerequisite: Permission of the instructor.

ENGR 4880U Principles of Fusion Energy. This course explores the nature and energy generating potential of fusion reactions. Topics include: matter-energy transformations; fusion reaction analysis; Coulomb repulsion; deuterium-tritium reactions; production, extraction and storage of tritium; energy efficiency; fusion fuels and wastes; fusion reactor blankets; burn cycles; characteristics and diagnostics of plasmas; magnetic and inertial confinement schemes for fusion; tokomak techniques; laser fusion techniques; damage to walls and other materials; fission-fusion reactions; ITER Project; global fusion research projects. 3 cr, 3 lec. Prerequisites: ENGR 2500U, ENGR 3930U.

ENGR 4890U Advanced Computer Networks. Advanced topics in computer networks with a particular emphasis on application-level protocols, transport protocols, network protocols and routing protocols used throughout the Internet. The course strengthens the student's understanding of fundamental concepts, requirements, and design tradeoffs, particularly as related to scheduling, congestion control, advanced routing protocols, traffic management, wireless access and mobility, and applications. More importantly, the course discusses how networking may evolve in the future to provide ubiquitous support for quality-of-service (QoS) in heterogeneous environments. 3 cr, 3 lec, 3 lab (biweekly), 2 tut. Prerequisite: ENGR 4650U.

ENGR 4900U Software Engineering Systems Design I. This course will cover the science of design and the morphology of design, as well as the impact of design on society. Students will work in small groups of three or four and they will complete a series of projects in which they will be expected to integrate efficient design methods, cost effectiveness and modern resources utilization. The "best" solution will be chosen from a group of solutions presented to them, based on specified criteria. A special requirement for students in engineering and management programs is that, because of the dual orientation of such programs, some of the design projects must be of an engineering- management type and involve business and/or management factors. 3 cr, 3 lec, 1 tut. Prerequisite: Successful completion of all non-elective courses in year three, i.e. ENGR 3140U, ENGR 3650U, ENGR 3770U, ENGR 3950U, ENGR 3360U or BUSI 1700U, ENGR 3700U, ENGR 3720U, ENGR 3960U, ENGR 3980U. Successful completion of all non-elective courses in year three.

ENGR 4901U Software Engineering Systems Design II. In this course, students will complete the design and development of the system that they first started in ENGR 4900U Software Engineering Systems Design I. By the end of this course students will have completed the following parts of the design process for their projects: design refinements based on findings from proof-of-concept prototype; detailed design and engineering analysis; test plan; test results and product validation; final project presentation; final project report; and prototype system demonstration. 3 cr, 3 lab, 1 tut. Prerequisite: ENGR 4900U.

ENGR 4920U Electrical Engineering Systems Design I. This course constitutes the first part of a two term design endeavour which will culminate in ENGR 4921U Electrical Engineering Systems Design II. It covers design considerations for systems that incorporate electrical engineering components and provides students with the opportunity for hands-on experience. Students work in teams to formulate the problem, propose an engineering solution or a design in the presence of technical and socioeconomic constraints, and make sound professional judgments among alternative solutions. This course is intended to teach the student about design constraints and trade-offs, various design methodologies and enhance the student's repertoire of professional problem-solving and engineering design skills in the context of realistic engineering situations. It provides the student with the opportunity to pull together and apply ideas and concepts learned throughout the curriculum-in the areas of communications, electronics, power, controls, and computers-through projects. By the end of this course students will have completed the following parts of the design process for their projects: customer requirements; background search; design plan and project management; brainstorming; preliminary concept generation; engineering specifications (benchmarking); detailed concept generation: functional decomposition; concept development and screening/selection; preliminary project presentation; preliminary design report; and proof-of-concept prototype demonstration. 3 cr, 3 lec, 3 lab. Prerequisite: Successful completion of all non-elective courses in year three, i.e. ENGR 3110U, ENGR 3140U, ENGR 3240U, ENGR 3070U, ENGR 3130U, ENGR 3230U, ENGR 3250U, ENGR 3490U.

ENGR 4921U Electrical Engineering Systems Design II. In this course, students will complete the design and development of the system that they first started in ENGR 4920U Electrical Engineering Systems Design I. By the end of this course students will have completed the following parts of the design process for their projects: design refinements based on findings from proof-of-concept prototype; detailed design and engineering analysis; test plan; test results and product validation; final project presentation; final project report; and prototype system demonstration. 3 cr, 1 tut, 3 lab. Prerequisite: ENGR 4920U.

ENGR 4930U Optical Communications. Optical technology and applications; basic characteristics of optical fibres and associated system components; design considerations for optical fibre links and multi-stage service requirements; engineering applications of optical devices. 3 cr, 3 lec. Prerequisite: ENGR 3240U.

ENGR 4994U Thesis Design Project I. The thesis design project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study, to satisfy specific objectives and requirements. The project topic will be selected to include some aspects of the student's specialization. Students will be required to organize and conduct a design project with a significant analytical component, including consideration of technical, economic, environmental and other societal impacts. Thesis Design Project I will typically be a group design project, but with each student having clearly defined roles, objectives and outcomes. The requirements include a written paper and a group presentation of the project outcomes. 3 cr, 1 lec, 4 lab, 1 tut. Prerequisite: Dean or dean designate's permission. Students must have completed all courses up to and including third year and be in clear standing.

ENGR 4998U Thesis Design Project II. The thesis design project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study, to satisfy specific objectives and requirements. The project topic will be selected to include some aspects of the student's specialization. Students will be required to organize and conduct a design project with a significant analytical and/or experimental component, including consideration of technical, economic, environmental and other societal impacts. Thesis Design Project II will typically be an individual design project, although with the approval of the professor, a significant and clearly delineated individual contribution to a group design project is acceptable. The requirements include a written paper and an individual presentation of the project outcomes. 3 cr, 6 lab. Prerequisite: ENGR 4994U and dean or dean designate's permission.

ENGR 4999U Design Thesis. An engineering thesis project relating to design, on a topic relevant to the student's program, will be carried out under the supervision of a faculty advisor. The course stresses independent work skills and the synthesis of knowledge acquired from previously studied courses. A wide range of design-related topics may be covered, including research and development, testing and/or evaluation of a system, process or device. Each student will prepare a formal technical report and will make an oral presentation. A special requirement for students in engineering and management programs is that, because of the dual orientation of such programs, the thesis topic be selected so as to allow the student to investigate, integrate and apply engineering and management principles, objectives and practices as a component of the design thesis. 3 cr, 6 tut. Prerequisite: Successful completion of all third year non-elective courses. ENGR 3395U or ENGR 4220U or ENGR 4330U or ENGR 4230U or ENGR 4080U or ENGR 4920U or ENGR 4900U.

ENVS 1000U Environmental Science. This course will introduce the conceptual, interdisciplinary framework of environmental science by examining its physical, biological, economic and social components. Topics will include environmental problems and scientific principles; ecological principles (ecosystems, nutrient cycles, geographic ecology, climate and biodiversity); resources and sustainability (food, water, energy and minerals); climate change; pollution (indoor and outdoor air, water, effects on health and ecosystems); energy (renewable, nonrenewable, management); agriculture and food production (pesticides and pest control, energy and chemical inputs, land, soil water resources, population and economic issues); waste management and remediation and prevention of environmental degradation. Canadian examples will be used wherever possible but the underlying theme will include a more global approach. 3 cr, 3 lec.

ENVS 2010U Introductory Environment Science. This course will introduce the scientific framework associated with the Earth's environment system. Topics include Earth's energy budget, structure and circulation of the atmosphere and oceans, hydrologic cycle, mass budget, cloud formation, precipitation, and surface run-off. Particular attention will be focused on the science of important environmental issues including climate change, ozone layer depletion, pollutant transport, impact of mercury, PCB and other contaminates, and land-use influence on precipitation run-off and flooding. Whenever possible, case studies of actual environmental problems will be used to highlight the importance of the scientific issues. 3 cr, 3 lec. Prerequisites: CHEM 1020U or CHEM 1800U, PHY 1020U or PHY 1040U, MATH 1020U.

ENVS 3020U Introductory Energy Science. Energy systems, resources and use; energy classifications and terminology; energy sources and currencies; energy supply and demand; energy conversion and utilization technologies; energy storage and distribution; energy use in countries and sectors of economies; energy intensity; global energy flows and utilization patterns; principal fuels; fuel science and technology: origins of fuels, classifications and physical and chemical properties of fuels, fuel handling and fire hazards, non-conventional fuels; sustainability, sustainable development and energy; clean energy systems. Environmental impact of energy systems such as power generation, industrial processes and transportation; air, soil and water pollution and their effects on the environment; generation mechanisms of chemical pollutants, photochemical pollutants and smog; Introduction to renewable energy resources (solar, wind, geothermal, biomass), photovoltaics, microturbines. Introduction to energy storage systems. Introduction to hydrogen and fuel cells. Introduction to life cycle assessment, industrial ecology, and key environmental tools. Application of energy and exergy analysis to energy systems. 3 cr, 3 lec. Prerequisites: ENVS 1000U and one of CHEM 2040U, PHY 2050U, ENGR 2010U, ENGR 2320U or ENGR 2640U. Credit restriction: ENGR 3260U.

ENVS 3110U Economics and Politics of the Environment. This course provides an overview of the social aspects of energy and the environment, with particular focus on economic, political, and management dimensions. The course will emphasize practical applications of theory to contemporary issues. Examples and discussion in the course will focus on matters of energy and the environment. 3 cr, 3 lec, 1 tut (biweekly). Prerequisite: ENVS 2010U.

FSCI 1010U Introductory Forensic Science. This course introduces forensic science to students with no prior knowledge of the subject. The course is co-ordinated by the professor but taught predominantly by guest speakers from the police and forensic community. A range of topics are covered and provide an overview of the many disciplines involved in forensic science. Having completed the course, the student will be aware of the multidisciplinary nature of forensic science, how a case is studied, the use of scientific techniques in case investigations and the presentation of evidence in court. The student will be encouraged to develop a critical approach to assessing evidence. 3 cr, 3 lec.

FSCI 2010U Crime Scene Science. This course introduces students to all the processes that occur at a crime scene. Students will be taught crime scene procedures, from the photography of the scene and record keeping at the scene through to the preservation and collection of evidence from crime scenes. This will include techniques for the recovery of fingerprints, footwear marks, and tool marks and the collection and correct packaging of items such as hairs, fibres, glass and that accompanies the collection and preservation of evidence. In addition to theoretical knowledge, students will experience the practicalities of searching for and recovering evidence from crime scenes. The evidence will be examined and considered in terms of the amount of information that can be obtained from the analysis. The module will stress the multidisciplinary nature of forensic investigations and integrate legal, practical and scientific aspects of crime scene investigations. 3 cr, 3 lec, 3 lab (biweekly), 3 oth (biweekly). Prerequisites: FSCI 1010U and enrolment in year two of any one of the Forensic Science, Physics specialization in Forensic Physics, or Computing Science specialization in Digital Forensics programs.

FSCI 3010U Criminalistics I. All of the techniques learned in Crime Scene Science, along with some new ones, are put into practice in order to process complex crime scenes and analyze the evidence. Criminalistics 1 provides the principles of the laboratory based searching, recovery of evidence, as well as the techniques and principles involved in the analysis of forensic evidence, such as serial number restoration, firearms examination, and ballistics. The students are also provided with the knowledge and ability to identify, collect and analyze fibres, other trace material, and biological fluids as they relate to sexual assaults and other violent offences. The course stresses the multidisciplinary nature of forensic investigations by integrating legal, practical, and scientific aspects of major scene investigations. There is also a brief introduction to the Canadian Criminal Code's substantive requirements for proof of the commission of the relevant crimes. Finally, the objective is to identify all the relevant forensic data to support the case, carry out the relevant analysis, and produce a report and presentation suitable for court use detailing the findings. 3 cr, 3 lec, 4 lab (weekly). Prerequisites: FSCI 2010U and enrolment in year three of any one of the Forensic Science, Physics specialization in Forensic Physics, or Computing Science specialization in Digital Forensics programs.

FSCI 3020U Forensic Biology. This course provides a comprehensive study of the molecular techniques, statistical concepts, and various casework applications involved in the field of forensic biology. Lecture and laboratory topics concentrate primarily on the protocols used for autosomal and Y chromosome Short Tandem Repeat (STR) analysis of human biological samples, but lectures also delve into the newer, special use and future technologies of Single Nucleotide Polymorphisms (SNPs), mitochondrial DNA analysis, as well as non-human DNA testing. In addition to discussions of technology, a significant portion of the course deals with interpretation of casework STR profiles, as well as issues surrounding quality assurance in laboratories. 3 cr, 3 lec, 4 lab (weekly). Prerequisites: FSCI 2010U, BIOL 2020U, BIOL 2030U, BIOL 2040U or BIOL 2080U, and successful completion of the 24 core courses and one elective (75 credit hours) required by the end of year three, semester one in the Forensic Science program map.

FSCI 3030U Criminalistics II. This course continues to build upon the material introduced in Criminalistics 1. It introduces students to new forensic science theories and techniques, as well as the Canadian and Ontario statutes and common law relevant to homicide and suspicious death investigations. Lectures and laboratories include a detailed examination of the field of blood stain pattern analysis (BSPA) and homicide investigations. This course also incorporates the principles of handwriting and questioned document analysis, as well as tackling palmprint analysis, soil analysis, forensic botany, and the emerging issues surrounding errors and quality assurance in forensic facilities. Finally, lectures discuss court procedures surrounding expert evidence testimony, and include one or more mock court presentations. 3 cr, 3 lec, 4 lab. Prerequisites: FSCI 3010U and successful completion of the 24 core courses and one elective (75 credit hours) required by the end of year three, semester one of the Forensic Science program map.

FSCI 3040U Forensic Chemistry. Forensic chemistry introduces the application of analytical chemistry to forensic science. The course focuses on chromatographic and spectroscopic techniques and their applications to forensic science, including: ink and toner identification, paint characterization, examination of tapes and adhesives, fire and explosion investigation, and detection of gunshot residue. The module will also incorporate the principles of light theory and chemical enhancement of fingerprints. 3 cr, 3 lec, 4 lab (weekly). Prerequisites: FSCI 2010U, CHEM 2030U and successful completion of the 24 core courses and one elective (75 credit hours) required by the end of year three, semester one in the Forensic Science program map.

FSCI 4010U Forensic Psychology. An overview of the various ways in which core areas of psychology (biological, clinic, cognitive, developmental, and social psychology) are applied to legal issues in both research and practice. The course focuses primarily on the application of psychology to criminal law. Students learn about scientific methods used to study forensic psychology topics (behavioural research methods) and learn about contemporary forensic psychology research. They gain an appreciation for the practice of forensic psychology, including the nature of the activity (e.g. psychological assessment and treatment in forensic settings, police psychology, and expert psychological testimony) and the practical and ethical constraints under which forensic psychologists practice. Although the specific topics covered may vary from term to term, sample forensic psychology topics covered in the course include forensic psychological assessment and treatment, eyewitness memory, interrogations and confessions, lie detection, police psychology, jury decision-making, psychopathy, investigative psychology, procedural justice, racial stereotyping, and wrongful conviction. 3 cr, 3 lec, 2 oth (biweekly). Prerequisites: PSYC 1000U and successful completion of the 31 core courses and two electives (105 credit hours) required by the end of year four, semester one in the Forensic Science program map.

FSCI 4020U Interdisciplinary Topics in Forensic Science. This course will investigate advanced interdisciplinary topics in forensic science including forensic anthropology, entomology, decomposition, archaeology, and other taphonomic agents. Students will gain an understanding of the effect of environmental variables on the process of decomposition and will conduct a search and recovery of decomposed remains. Additionally, students will collect and analyse entomological, anthropological and environmental evidence for correlation with the decomposition process. At the completion of the course, students should have a greater understanding of the interdisciplinary nature of forensic investigations and the multitude of disciplines available to investigators when decomposed or skeletal remains are involved. 3 cr, 3 lec, 4 lab. Prerequisites: FSCI 3020U, FSCI 3030U, FSCI 3040U and enrolment in year four of the Forensic Science program.

FSCI 4030U Forensic Drug Chemistry and Toxicology. This course will provide an introduction to forensic drug chemistry and toxicology that builds from information and skills acquired from prerequisite courses that include forensic chemistry (FSCI3040U), forensic biology (FSCI3020U), and principles of pharmacology (BIOL3020U). The course will compare the roles of the forensic drug chemist and toxicologist, including the analysis of drug samples, and drugs/metabolites in biological samples. Students will be exposed throughout the course to critical thinking that may be required in potential forensic drug chemistry and toxicology case scenarios. The lecture portion of the course will be provided in four parts. Principles of forensic drug chemistry and forensic toxicology will be covered first. Next will be general analytical considerations. The third part will be selected analyte drug classes that include alcohol and other volatiles, amphetamines, cocaine, cannabinoids, GHB, LSD, PCP and psilocybin, and selected therapeutic drug classes that include sedatives, hypnotics, antidepressants, antipsychotics, analgesics, anaesthetics, antihistamines, and anticonvulsants. Finally, student presentations will involve current area(s) of forensic interest/application for an assigned drug. 3 cr, 3 lec, 4 lab (weekly). Prerequisites: BIOL 3020U, FSCI 3020U, FSCI 3040U and enrolment in year four of the Forensic Science program.

FSCI 4050U Law for Forensic Scientists. This course explores aspects of criminal law, with the goal of understanding forensic science within a legal context. Topics include: structure of the courts system and the criminal procedures used in it, roles of the forensic scientist in criminal procedures, rules of evidence, role of expert witness. 3 cr, 3 lec. Prerequisites: Successful completion of the 31 core courses and two electives (105 credit hours) required by the end of year four, semester one in the Forensic Science program map; or clear standing in year four of the Physics specialization in Forensic Physics or Computing Science specialization in Digital Forensics programs.

FSCI 4410U Forensic Science Thesis Project I. The thesis project provides students with the opportunity, under the supervision of a faculty member or a forensic professional, to integrate and synthesize knowledge gained throughout their program of study and to satisfy specific objectives and requirements. The project will be selected to include research that has been approved by the supervising faculty member and forensic professional. Students will submit a progress report at the end the first semester. 3 cr, 9 oth. Prerequisites: Students will have completed all 90 credit hours required by the end of year three in the forensic science program map, be in clear standing, and be enrolled in year four of the Forensic Science program and must obtain prior consent of a faculty member. Note: Students are expected to take FSCI 4420U in the following semester.

FSCI 4420U Forensic Science Thesis Project II. A continuation of the project started in FSCI 4410U. Students will make presentations based on their research and submit a written thesis at the completion of the project. 3 cr, 9 oth. Prerequisites: FSCI 4410U and successful completion of the 31 core courses and two electives (105 credit hours) required by the end of year four, semester one in the Forensic Science program map. Note: Students are expected to take this course immediately following FSCI 4410U.

FSCI 4430U Directed Studies in Forensic Science. This course requires independent research of a current topic in a specialized area of forensic science, including, but not restricted to, biology, chemistry, anthropology, and the application of science to law. The topics will be selected from the recent research literature and involve a review and critical appraisal of underlying experiential principles. The course comprises independent library research, participation in weekly meetings, and written and oral presentations. 3 cr, 3 oth. Prerequisites: Students will have completed all 90 credit hours required by the end of year three in the Forensic Science program map, be in clear standing, be enrolled in year four of the Forensic Science program, and will obtain prior consent of a faculty member.

HLSC 0880U Science Bridge. This course provides students with opportunity to review and enrich their knowledge in science concepts which are fundamental to the study of health science. Review of essential mathematics, physics, chemistry and human biology will be provided. Assignments will be designed to assess and develop skills in scientific inquiry and application of fundamental science and mathematics to situations encountered in professional practice. 3 cr, 3 lec.

HLSC 1200U Anatomy and Physiology I. This course introduces normal anatomy and physiology as scientific disciplines. Focusing on homeostasis and the interrelationships of structure and function as the underpinnings for the maintenance of life, the human organization from the molecular to the system levels will be studied, with specific attention to the organization of the human body, principles of support and movement, and the nervous system. Students will also develop a working scientific vocabulary to communicate effectively within the scientific community. This is the introductory component of a two-semester investigation of human biology. 3 cr, 3 lec, 1 tut.

HLSC 1201U Anatomy and Physiology II. This course is a continuation of Anatomy and Physiology I. With continued focus on homeostasis and the interrelationships of structure and function, focus will be on the systems level of human physiology. The scientific investigation of the circulatory systems including both the cardiovascular and lymphatic systems are further areas of study, along with the respiratory, digestive, urinary, and reproductive systems. The concept of homeostasis will be investigated in depth as it relates to fluid, electrolyte and acid-base balances. 3 cr, 3 lec, 1 tut. Prerequisite: HLSC 1200U.

HLSC 1300U Information and Communication Technology in Health Care. An introductory course that provides instruction and experiences that will assist first-year students in making a successful transition into the university community and the use of computers in health care. The course is designed to develop personal-management skills, acquire a comprehensive orientation to university personnel, facilities, and other resources for use in the UOIT web-centric and laptop environment in health sciences. Modules will be included on time management, e-etiquette, web tools, spreadsheets, file management, presentation tools, and online reference tools: 3 cr, 3 lec. Credit restriction: CSCI 1000U or CSCI 1800U.

HLSC 1701U Academic Writing: Perspectives in Health. This course is designed to help students improve their written communication skills in the health sciences. Students will explore the Internet, learning to discriminate between scholarly and non-scholarly resource material. They will learn to search databases, via the Internet or using the UOIT library, to find academic literature. In addition, the students will search for statistics and facts about chronic diseases, communicable diseases, sexually transmitted infections, and environmental issues that affect health status. The students will learn to prepare literature searches as annotated bibliographies, to interpret research reports, and to critically appraise the literature. The course will culminate with students writing an academic paper that has been properly edited.

At the end of the course, students will have broadened their knowledge of health and the health care system. 3 cr, 1.5 lec, 1.5 online.

HLSC 2030U Theory and Practice of Interpersonal Communication. An interdisciplinary course in interpersonal communication, designed to provide health sciences students with theory and practice in core individual and group communication principles that will prepare them for professional relationships with clients, colleagues, team members and supervisors in the complex environment of the health care community. 3 cr, 2 lec, 1 tut. Prerequisite: HLSC 1700U or 1701U.

HLSC 2110U Foundations in Clinical and Exercise Biochemistry. A comprehensive study of human biochemistry which introduces major biopolymers and bio-molecules, metabolic pathways, mechanisms of control and gene function. This course will present how the basic principles of biochemistry underlie the normal physiological functions in humans. Topics will include nucleic acids, protein structure and function, enzymes, membranes, and lipid, nitrogen, and carbohydrate metabolism. This course will better prepare Health Sciences students to be able to make rationale and informed decisions in a health care environment by providing them with the foundational biochemical knowledge underlying human health. The lecture component will be structured towards introductory human biochemistry while tutorial topics will emphasize the relevant clinical applications to Medical Laboratory Science and to Exercise Physiology. This foundational knowledge will serve as the intellectual basis for advanced courses in Medical Laboratory Science and Kinesiology. 3 cr, 2 lec, 2 tut. Credit restriction: BIOL 2040U.

HLSC 2201U Introduction to Health Information Management. Introduces the basic principles of health information management as applied to a variety of health and social areas. Explores knowledge and skills in the field of health data collection, storage and process communication. Demonstrates the proper use of medical terminology. 3 cr, 3 lec. Prerequisites: HLSC 1200U, HLSC 1700U or HLSC 1701U.

HLSC 2202U Comprehensive Anatomy and Physiology. This course will introduce and connect normal anatomy, physiology and biochemistry as scientific disciplines with particular emphasis on the application of relevant concepts to the clinic. Students with previous clinical experience, will enrich their practice by updating their knowledge and refreshing skills to apply and integrate basic concepts to clinical practice. 3 cr, 1.5 lec, 1.5 online. Note: Enrolment in this course is limited to students registered in the Post RPN or Post RN programs. Prerequisite: HLSC 0880U.

HLSC 2400U Introduction to Movement Neuroscience. This course is designed to extend Stage 1 Basic concepts of the functional anatomy of the human nervous system into a broader comprehension of the neuroanatomical, neurophysiological, and cognitive – behavioural approaches prevalent within neuroscience. The course sets out to establish a sound foundation for Stage 3 comprehension and graduate level study of the human motor system. 3 cr, 2 lec, 2 lab. Prerequisite: HLSC 1201U. Credit restriction: HLSC 3400U.

HLSC 2401U Human Growth and Motor Development. The purpose of this course is to provide the student with an understanding of human growth and development across the lifespan and understand the factors that influence changes in behaviour from a developmental perspective. Students will gain an understanding of the major theoretical perspectives of motor development and will be able to consider the acquisition of motor skills within the framework of these theories. 3 cr, 3 lec, 1 tut. Prerequisites: HLSC 1201U, PSYC 1000U.

HLSC 2460U Pathophysiology I. This course will be an introduction to human disease and focus on how alterations in homeostatic mechanisms disrupt the human body. It will initially concentrate on central concepts of pathophysiology such as how cells and tissues respond to pathogenic challenges, principles behind genetic disorders, alterations in immunity and inflammation, stress and disease and cancer biology. These principles will be then applied to understanding the pathogenesis of common diseases affecting the neurologic, endocrine and reproductive systems. A good understanding of normal anatomy and physiology is an essential prerequisite. 3 cr, 2 lec, 1.5 tut. Prerequisite: HLSC 1201U or HLSC 2202U.

HLSC 2461U Pathophysiology II. This course will build on the HLSC 2460U Pathophysiology I course. The student will explore common disorders in specific systems including hematologic, cardiovascular, respiratory, urinary, gastrointestinal, musculoskeletal and integumentary. The course will finalize with a look at multi organ dysfunction syndromes, including those associated with shock and burns. A good understanding of normal anatomy and physiology, and a solid pathophysiology background are essential prerequisites. 3 cr, 2 lec, 1.5 tut. Prerequisite: HLSC 2460U.

HLSC 2462U Altered Physiology: Mechanisms of Disease I. This course is an introduction to how normal physiology becomes altered through the course of human disease and focuses on the biological mechanisms that drive those changes. It initially concentrates on central concepts of human disease, such as abnormal states in cell and tissue biology, the principles behind genetic disorders, immunity, inflammation, hypersensitivities, stress and disease, and cancer. These principles become essential to understanding the pathogenesis of common diseases affecting the neurological, endocrine and hematologic systems. 3 cr, 3 lec, 1 tut. Prerequisites: HLSC 1201U or HLSC 2202U. Credit restriction: HLSC 2460U.

HLSC 2463U Altered Physiology: Mechanisms of Disease II. This course continues to build on the mechanisms of disease progression occurring in specific systems including cardiovascular, respiratory, urinary, digestive, musculo-skeletal, integumentary and reproductive. A good understanding of normal anatomy and physiology, and a solid understanding of disease concepts from Altered Physiology I are essential prerequisites. 3 cr, 3 lec, 1 tut. Prerequisite: HLSC 2462U. Credit restriction: HLSC 2461U.

HLSC 2601U Introduction to Health Management. Examines key areas that comprise the field of health care management by building on the root disciplines of organization theory, strategic management and organizational behaviour. Topics include the design and managerial roles in health care organizations, leadership and motivation, work team performance, and interorganizational relationships. 3 cr, 3 lec. Prerequisite: HLSC 1700U or HLSC 1701U.

HLSC 2700U Mathematical Reasoning in Health Sciences. In this course, we explore quantitative reasoning in the health sciences. It is designed as an introductory course to prepare students for upper division courses in statistics and research. In addition, this course will help students develop broader perspectives and appreciation of how and why to use mathematical reasoning and analyses in real-world problems related to healthcare and the health sciences. Students will learn technical writing and critical appraisal of research articles, with a special focus on the mathematical skills required to interpret research literature. Simulations of healthcare scenarios will be used to provide learning environments in which students develop quantitative reasoning skills. 3 cr, 3 lec.

HLSC 2800U Health and Wellness. This course explores the foundations of promoting health and wellness, examines current research, and provides an overview of strategies and approaches used in community settings. The central premise of the course is that health promotion action should assist individuals and groups to empower themselves and bring about change in order to optimize health and quality of life. 3 cr, 3 lec. Prerequisite: HLSC 1300U or HLSC 1700U or HLSC 1701U. Credit restriction: HLSC 1801U.

HLSC 2801U Understanding Health Care and Therapeutics in Canada. This course provides a forum to critically examine theories, concepts and issues related to health care and therapeutics in Canada for diverse populations across the lifespan. The evolution of health care and current challenges facing diverse populations including children, women, Aboriginal people, and the elderly shall be critically examined. Topics include the determinates of health, public versus privately funded health care delivery, role of technology in health care delivery in urban and rural settings, establishing disease causation for acute and chronic disease, the growth of alternative medicine and homeopathies, and occupational, environmental and population health. 3 cr, 3 lec. Prerequisite: HLSC 1300U or HLSC 1700U or HLSC 1701U. community resources. 3 cr, 3 lec. Prerequisite: HLSC 1201U or HLSC 2202U. Credit restriction: HLSC 2825U.

HLSC 2820U Nutrition for Nursing Practice. This course will focus on nutrition as a determinant of health. Learners will examine the basic principles and applications of nutrition throughout the life cycle. Physiological, psychological, socio-economic, physical, educational and cultural factors which influence both access to food and eating behaviours are explored using a population health promotion framework. Special emphasis is given to innovative and effective community-based nutrition programs and services in Canada targeting at-risk groups and the identification of appropriate nutrition-related community resources. 3 cr, 3 lec. Prerequisite: HLSC 1201U or HLSC 2202U. Credit restriction: HLSC 2825U

HLSC 2825U Nutrition and Health. This course introduces the principles of human nutrition as they relate to health and health promotion. Topics covered include dietary standards and guidelines, macro and micronutrient sources, energy balance and healthy body weight, sport nutrition, diet and chronic diseases, food safety and food technology. Current issues such as nutrition quackery, fad diets, vegetarian diets, vitamin/mineral supplements and organic foods will be explored. 3 cr, 3 lec, 1 tut. Prerequisite: HLSC 1201U or HLSC 2202U. Credit restriction: HLSC 2820U.

HLSC 3020U Health and Exercise Psychology. This course aims to develop an understanding of the complexity of the relationship between the human psychological and physiological response to physical movement and activity. The emphasis is placed on understanding the concepts, principles, and theories involved in the promotion and safe practice of exercise behaviour. 3 cr, 2 lec, 2 oth. Prerequisite: PSYC 1000U.

HLSC 3201U Understanding Health Data. Health data standards are important in the Canadian health care system, supporting a number of data and information needs including: administrative functions (managing and funding healthcare), health research, and the electronic health record. This course focuses on the major Canadian health data standards used to capture and communicate information on the Canadian healthcare system. Healthcare classification and nomenclature systems will be discussed with emphasis placed upon, but not limited to, ICD-10- CA/CCI. Major data collection systems will be covered, as well as the importance of data integrity and data quality. Various software tools used to classify data will be utilized within the course. Specific CIHI databases used to collect health data for administrative and research purposes will also be covered. Students will have the opportunity for hands on experience with the classification systems and software tools. 3 cr, 2 lec, 2 lab. Prerequisites: HLSC 2201U, HLSC 2461U.

HLSC 3202U Health Data for Decision Making. Through lectures and laboratory experience, this course will provide hands-on experience in the use of routinely collected and reported health care data. Students will have access to leading health information and report writing software. Aspects of the reporting system and data collected within the system will be covered. Students will program reports and analyze health data to answer business questions within the health care setting. Clinical registries, databases and patient grouping methodologies will be discussed and used as data collection and reporting mechanisms. The focus of the course will be on providing the students with the knowledge and skills needed to identify data and information needs, program reports to extract data and analyze health information for use by various levels of management within a health care facility. 3 cr, 3 lec, 2 lab. Prerequisite: HLSC 2201U.

HLSC 3212U Fundamentals of Managing Health Information. When developing information systems specific to health care, a number of special considerations must be applied. The health industry at large has developed a number of standards, practices and guidelines to assist in the development, implementation and maintenance of secure and efficient health information systems to meet industry and legislative requirements. This course will provide the student with the health information management foundational principles to be incorporated in the development, implementation and maintenance of such systems. 3 cr, 3 lec, Prerequisite: HLSC 2201U.

HLSC 3410U Human Motor Control and Learning. This course develops a critical approach to the understanding of human movement science. The content specifies integration of the neurological, physiological, psychological and integrated dynamics underlying human motor control and learning. Applications of these themes include analysis of normal movement control mechanisms and the assessment of these mechanisms in borderline states of performance and normal and abnormal conditions of aging and degeneration. It is intended that this course will establish a sound foundation for post-graduate study in clinical disciplines and care interventions used in movement rehabilitation. 3 cr, 2 lec, 2 lab. Prerequisite: HLSC 3470U.

HLSC 3420U Theory and Practice of Patient Centred Care. This course provides students in health sciences with the breadth and depth of knowledge to understand and evaluate patterns of care giving, likely to improve patient outcomes. Interdisciplinary and integrative perspectives are used to examine the medical, nursing, medical laboratory, and information management facets of patient-centred care. Students use an evidence-based framework to analyze elements of patient-centred care, including human interactions, alternative and complementary medicine and nursing, family involvement, access to education and information, nutrition, architectural design of care giving settings, as well as the importance of therapeutic touch, the, arts, and spirituality in healing. 3 cr, 3 lec. Prerequisite: HLSC 1201U or HLSC 2202U.

HLSC 3421U Issues in Women's Health. This course focuses on health issues across the lifespan that are significant to women as recipients and providers of health care in western and global contexts. Models of health and illness and women's health movements will be explored. Students will be challenged to develop their skills in critical analysis to consider the implications of gender/sex and other social status variables on women's health. 3 cr, 2 lec, 1 tut. Prerequisite: 54 credit hours.

HLSC 3462U Advanced Pathophysiology. This course focuses on the development of skills by which future health professionals will be able to use pathophysiology in clinically significant ways. It does so by emphasizing the application and integration of important pathophysiological concepts into clinical case situations, published research studies, self generated clinical questions and education. Prerequisites: A grade of at least B- in HLSC 2460U and HLSC 2461U.

HLSC 3463U Human Genetics in Society. We are living in the genomics era – the human genome has been sequenced and the analysis of its code to reveal the function of its genes in health and disease is making breathtaking progress. There is considerable new knowledge that must now be applied in the health professions, and an understanding of the exciting topics within the field of genetics is an essential component of health sciences education. This course will begin by covering the principles of human genetics and heredity while highlighting the issues of genetics in our society. The second half of the course will concentrate on understanding the genetic basis of human disease and the impacts of genomics on healthcare. 3 cr, 3 lec. Prerequisite: 54 credit hours. Credit restriction: BIOL 2020U.

HLSC 3470U Kinesiology I: Anatomy of Human Movement. This course aims to develop an understanding of the structure, and function of the human musculoskeletal system and its role in producing movement. The course takes a regional approach and covers the anatomy of the upper limb, vertebral column (neck and back), abdomen, and lower limb. 3 cr, 2 lec, 2 lab. Prerequisite: HLSC 1201U. Corequisite: HLSC 2400U.

HLSC 3480U Principles of Fitness and Exercise Prescription. This course provides an introduction to the risks and benefits of exercise, exercise policy and safety, physical fitness testing, guidelines for exercise test administration, principles of exercise prescription and cardiorespiratory and neuromuscular training. The basic principles of safe exercise prescription, for both cardiorespiratory and neuromuscular training, are introduced. The course combines both lecture and laboratory/tutorial format so that students are exposed to the most commonly used equipment for both exercise testing and prescription. 3 cr, 2 lec, 2 oth. Prerequisite: HLSC 2400U or HLSC 3400U.

HLSC 3481U Exercise Physiology. This course aims to develop an understanding of the human physiological response to exercise. Topics include energy metabolism, and the respiratory and cardiovascular response to physical exercise. 3 cr, 2 lec, 2 lab. Prerequisite: HLSC 3480U.

HLSC 3501U Health Law. This course introduces students to the legislation and practices that govern the health care system in Canada. It emphasizes the legal and ethical responsibilities that health care professionals have and examines the importance of documentation for both the provider and the client. 3 cr, 3 lec. Prerequisite: 24 credit hours. Credit restriction: HLSC 2501U.

HLSC 3601U Interprofessional Health Care Teams. The use of well organized cross-functional teams has led to dramatic improvements in innovation, productivity and levels of service for organizations in all sectors. The course will focus on the meaning and nature of purposeful relationships with an emphasis on interpreting and facilitating team interactions. Students will deal with issues such as empowerment, team building, motivation, diversity, conflict management, negotiation and change. 3 cr, 3 lec. Prerequisite: HLSC 2030U or HLSC 2601U or NURS 2420U or NURS 0420U.

HLSC 3630U Health Finance. This course is designed to introduce students to the methods of funding health care institutions and budget preparation as a management tool. The major components to the course include financial management, factors included in budget preparation, techniques of preparing staffing patterns, as well as capital and operating (staff/supply) budgets, cost monitoring and variance analysis. 3 cr, 3 lec. Prerequisite: HLSC 2601U.

HLSC 3710U Ethics. In this course the student will examine theories related to the ethical foundations of health care practice. In particular, the student will examine the professional code of ethics for health professions and the role of the health disciplines in advocating for improved health care. Ethical decision-making will be explored. 3 cr, 3 lec. Prerequisite: 24 credit hours.

HLSC 3800U Critical Appraisal of Statistics in Health Science. This course offers an introduction to critical appraisal skills in assessing evidence presented in health science, with a focus on real-life relevance. The application of statistical methods to the study of research questions will be explored in terms of both descriptive and inferential statistics. Topics to be included are: randomized experiments and observational studies, measurements, frequency distribution, measures of central tendency and variability, correlation and regression, sample survey, probability, confidence intervals construction and hypothesis testing. 3 cr, 3 lec. Prerequisite: 24 credit hours. Credit restrictions for all science students: STAT 2010U, STAT 2020U, STAT 2800U.

HLSC 3805U Introduction to Epidemiology. This course offers an introduction to the fundamentals of epidemiology. The application of epidemiologic principles will be discussed using real-life examples and scientific literature in health science. Topics include historic development, basic concepts, key terminologies and health indicators, descriptive and analytic epidemiology, design strategies and statistical analysis in epidemiology. Other topics may be included if time permits. 3 cr, 3 lec. Prerequisite: HLSC 3800U.

HLSC 3910U Research Methods for Health Care Professionals: Theory and Application. This course will critically examine a variety of research theories and methodologies employed by both quantitative and qualitative allied health care researchers. The student will be able to critically examine, interpret, analyze and apply findings from published research reports from both human and nonhuman investigations conducted in a variety of laboratory, clinical and community-based research settings. The course will critically examine how published research reports are utilized as the basis for evidence-based practice. Students will have an opportunity to engage in hands-on quantitative and qualitative research experiences including formulating research questions, research design, data collection, database management and coding, interpretation of findings, and their implications for practice. 3 cr, 3 lec. Prerequisite: HLSC 3800U.

HLSC 4201U Advanced Health Information Management. Building on the concepts presented in the introductory course, students will look at topics related to data collection, analysis and storage more in depth. In particular, students will look at the complexities of the coding and classification of medical data. The course will include a laboratory component covering spreadsheets and databases and practice with various coding systems. Issues related to freedom of information, privacy, confidentiality and security of information, and legal issues in dealing with health information will be discussed. 3 cr, 3 lec. Prerequisite: HLSC 3202U.

HLSC 4202U Health Information Management Capstone. This is the final course in the HIM program. This course is conducted as a field placement within a real-life work setting. Students will work at their field placement site with their course instructor to identify a project of sufficient scope that will incorporate various theories and practices they have covered to date within the HIM program. Students will synthesize and integrate theories and practices learned from all courses in the program and will apply those theories and practices toward appropriate projects within the HIM environment. This course is an exercise in the practical application of new knowledge learned so that students who complete the program will be proficient at an entry-level role in current HIM practice. 3 cr. Prerequisites: BUSI 2550U, BUSI 3040U, HLSC 3201U, HLSC 3910U, HLSC 4201U.

HLSC 4401U Motor Behaviour and Developmental Disabilities. The purpose of this course is to provide the student with a thorough understanding of the factors that contribute to the motor behaviour characteristics of children with developmental disabilities. The emphasis will be place on empirical literature in the paediatric disability domain to derive instructional and rehabilitation practices with this population. Application of this empirical knowledge to planning, assessing, prescribing, implementing and evaluating movement, rehabilitation, and sport skill programs for children with paediatric disabilities will be the focus. 3 cr, 2 lec, 2 lab (biweekly). Prerequisites: HLSC 2461U or HLSC 2463U, HLSC 3410U.

HLSC 4412U Exercise Rehabilitation I: Cardiac, Respiratory and Metabolic Conditions. This course focuses on the role of exercise in a multi-component approach to rehabilitation. The risks and benefits of exercise, particularly with respect to sedentary individuals and/or those with medical considerations as well as the evidence for the role of exercise as a primary or adjunctive intervention for rehabilitation are considered. The second part of the course integrates this information, along with relevant pathophysiology and exercise physiology using case study presentations of clients with cardiovascular, respiratory and metabolic conditions. 3 cr, 3 lec. Prerequisites: HLSC 3480U, HLSC 3481U. Credit restriction: HLSC 4402U.

HLSC 4413U Exercise Rehabilitation II: Integrated Case Studies. This course focuses on the role of exercise in a multi-component approach to rehabilitation. The risks and benefits of exercise, particularly with respect to sedentary individuals and/or those with medical considerations as well as the evidence for the role of exercise as a primary or adjunctive intervention for rehabilitation are considered. The course covers the psychology and physiology of chronic pain including the role of cognitive behavioural therapy, selection and assessment of appropriate rating scales and evaluation procedures and assessment of risk factors for exercise. The second part of the course integrates this information, along with relevant pathophysiology and exercise physiology using case study presentations of clients with neural and musculoskeletal conditions. 3 cr, 3 lec. Prerequisites: HLSC 3480U, HLSC 3481U, HLSC 4471U. Credit restriction: HLSC 4403U.

HLSC 4414U Advanced Topics in Neuromuscular Physiology and Pathophysiology. This course investigates advanced topics in neuromuscular physiology and pathology that are important for the control of human movement. There is a focus on the neurophysiology underlying human movement pathologies with a contextual integration of the principles of advanced neuroscience to neuromuscular rehabilitation. 3 cr, 2 lec, 2 tut. Prerequisites: HLSC 3410U.

HLSC 4460U Selected Topics in Physical Activity and Health. Designed for senior students this course will investigate current topics in physical activity and health from multiple perspectives. A minimum of five topics will be selected for study and each will be addressed approaching the topic from a different perspective: including but not limited to; physiological, biomechanical, social, psychological and ethical. 3 cr, 3 lec. Prerequisite: 84 credit hours or permission of the faculty.

HLSC 4471U Kinesiology II: Musculoskeletal Biomechanics (formerly HLSC 3471U). This course aims to develop practical knowledge of the biomechanical principles needed to evaluate and understand musculoskeletal function and dysfunction. The course covers the biomechanics of musculoskeletal tissues and structures, the biomechanics of joints, and the application of biomechanics to assessment of posture, gait, balance and movement. The principles are applicable in rehabilitation and prevention of neuromusculoskeletal injury. 3 cr, 2 lec, 2 lab. Prerequisite: HLSC 3470U. Credit restriction: HLSC 3471U.

HLSC 4472U Clinical Biomechanics and Ergonomics. This course builds on and applies concepts from Biomechanics and Epidemiology to better provide students with the background to understand and prevent work-related musculoskeletal injuries. Topics include the epidemiology and mechanisms of work-related injuries, workplace assessment for injury risk, pre-employment screening and legislated guidelines. Special focus will be given to low back and upper limb injuries. 3 cr, 2 lec, 2 lab. Prerequisite: HLSC 4471U.

HLSC 4482U Advanced Exercise Prescription. This course applies scientific interpretation of physical testing results for the prescription of accurate and progressive exercise programmes for people with co-existing health problems including disease and injury. This will involve advanced application of the principles of exercise prescription in combination with scientific evidence for specific exercise modalities. The course reviews the American College of Sports Medicine guidelines for exercise prescription and progression and their scientific evidence as well as baseline history taking, rationale, contraindications, privacy issues. 3 cr, 2 lec, 2 lab. Prerequisite: HLSC 3480U.

HLSC 4490U Kinesiology Internship I. The purpose of this course is to provide the student with practical experience in the kinesiology field. Examples of internships might be in fitness centres, hospitals, or working with sports teams working as a strength and conditioning coach. Students may do a single semester (3 credits) or continue in HLSC 4491U – Kinesiology Internship II. Students will complete a minimum 135 hours in their placement position and be required to write a comprehensive report on the kinesiology knowledge that they utilized from their undergraduate courses in contributing to the internship placement, as well as how the placement helped them to integrate that knowledge for their own learning. Note: Students choosing to continue in HLSC 4491U will not receive a grade for HLSC 4490U until the subsequent course is complete. 3 cr. Prerequisite: HLSC 3020U, HLSC 3481U, HLSC 4482U. Credit restriction: HLSC 4492U.

HLSC 4491U Kinesiology Internship II. This course is a continuation of HLSC 4490U for students who would like to expand on their placement experience and the application of kinesiology curriculum content to practice. The purpose of this course is to provide the student with practical experience in the kinesiology field. Students will complete a minimum 135 hours in their placement position and be required to write a comprehensive report on the kinesiology knowledge that they utilized from their undergraduate courses in contributing to the internship placement, as well as how the placement helped them to integrate that knowledge for their own learning. Note: Students choosing to take HLSC 4491U must do so immediately following HLSC 4490U. 3 cr. Prerequisite: HLSC 4490U. Credit restriction: HLSC 4493U.

HLSC 4492U Athletic Therapy Internship I. The purpose of this course is to provide the student with practical experience in the athletic therapy field. Students will be provided with advanced first aid and athletic therapy training before being placed with a varsity team as a student therapist. Students must do a double semester placement for this choice (6 credits). Students will complete a minimum 135 hours per semester in their placement position and be required to write a comprehensive report on the kinesiology knowledge that they utilized from their undergraduate courses in contributing to the internship placement, as well as how the placement helped them to integrate that knowledge for their own learning. Note: Students continue in HLSC 4493U and will not receive a grade for HLSC 4492U until the subsequent course is complete. A supplemental course fee will apply. 3 cr. Prerequisite: HLSC 3020U, HLSC 3481U, HLSC 4482U. Credit restriction: HLSC 4490U.

HLSC 4493U Athletic Therapy Internship I. The purpose of this course is to provide the student with practical experience in the athletic therapy field. Students will be provided with advanced first aid and athletic therapy training before being placed with a varsity team as a student therapist. Students must do a double semester placement for this choice (6 credits). Students will complete a minimum 135 hours per semester in their placement position and be required to write a comprehensive report on the kinesiology knowledge that they utilized from their undergraduate courses in contributing to the internship placement, as well as how the placement helped them to integrate that knowledge for their own learning. Note: Students are expected to take this course immediately after HLSC 4492U. 3 cr. Prerequisite: HLSC 4492U. Credit restriction: HLSC 4491U.

HLSC 4610U Systems Analysis in Health Care. An introduction to the techniques of operations research and their application to health care systems. Topics may include: scheduling, resource allocation, inventory management, decision-support systems, forecasting, risk assessment and analysis. 3 cr, 3 lec. Prerequisite: HLSC 3800U.

HLSC 4620U Quality Improvement in Health Care. Quality is achieved through planning, directing and implementing the actions that are consistent with the concept of doing the right thing right the first time. Students will learn the tools of quality management, quality assessment and quality assurance in a health care setting. Students will learn how to identify the quality principles, continuous improvement concepts, and to review and determine the cost of quality. 3 cr, 3 lec. Prerequisite: HLSC 3800U.

HLSC 4802U Public Health in Canada: Theory, Application and Challenges. This course is intended for all allied health care students interested in practicing in the public health sector in Canada. This course is built around the 36 core competencies deemed essential for all health care professional and workers in Canada as outlined by the Public Health Agency of Canada (PHAC, 2007). This course critically examines concepts related to public health and the primary health care approach in reference to current theory, research and practice mandates. Current public health challenges facing Canadians across the lifespan will be examined. Topics include: the role played by public health in meeting health care challenges facing vulnerable populations such as children, the elderly and Aboriginal populations; electronic health records; the predicted shortage of health care professionals; pandemic and disaster planning; occupational and environmental health. 3 cr, 3 lec. Prerequisite: 54 credit hours. Note: This course is not open to students enrolled in a BScN program.

HLSC 4803U Global Health. As the world becomes more interdependent, the health of individuals and the health of nations are increasingly inter-related and global health is of vital concern. This course addresses key issues of global health and features problems concerning both developed and developing countries. 3 cr, 3 lec. Prerequisite: HLSC 3805U.

HLSC 4806U Fundamentals of Clinical Trials. This course offers an overview of clinical trials and other forms of intervention and experimental studies involving human subjects. There is a focus on the application of knowledge at both clinical and community settings. Designs and issues in conducting clinical trials and intervention studies are critically explored. 3 cr, 3 lec. Prerequisite: HLSC 3910U or approval by instructor.

HLSC 4820U Interdisciplinary Collaboration. This course will introduce students to key components of interprofessional collaboration in health care. The course will be divided into two major components. First, the differences between professions will be studied by having students exploring the traditions, epistemology, and values of their respective professions. Professional roles, responsibilities, decision making, power and authority in health care will be examined. Second, case studies will allow students to explore and develop personal/ professional competencies for interprofessional practice. 3 cr, 2 lec, 1 oth.

HLSC 4850U Current Issues in Health Care. This course is designed to assist students in explaining current trends and issues confronting the health care system and health care professionals. Issues include, but are not limited to, technology in health care, the role of interprofessional health care teams, economic and political aspects of health care, influences on health policy, the roles of regulatory bodies, and globalization. 3 cr, 3 lec. Prerequisite: HLSC 3910U or MLSC 3111U.

HLSC 4910U Introduction to Community Based Research for Health. This course will acquaint students in the Health Sciences to the historical, theoretical and practical aspects of Community Based Research (CBR) and explore the challenges and advantages of engaging in CBR. The community-based research approach uses principles of health promotion to engage communities in a collaborative process of research to equitably involve all partners in the research process. The key to CBR principles is the recognition of the unique strengths that each partner brings. CBR begins with a research topic of importance to the community with the aim of combining knowledge and action for social change to improve community health and eliminate health disparities. 3 cr, 3 lec. Prerequisite: HLSC 3800U.

HLSC 4996U Research Applications I (formerly HIM Research Project I). This research course gives students an opportunity to explore all phases of the research process through a series of specially designed research applications. For example: defining the research questions, methodology, ethics, measurement, analysis, and interpretation. Students registered in HLSC 4996U must register in HLSC 4997U to receive a grade. 3 cr, 3 lec. Prerequisites: HLSC 3805U, HLSC 3910U.

HLSC 4997U Research Applications II. A continuation of the project started in HLSC 4996U. Students will make presentations based on their research and submit written work. 3 cr, 3 lec. Prerequisite: HLSC 4996U. Note: Students are expected to take this course immediately after HLSC 4996U.

HLSC 4998U Research Practicum I. The research practicum project provides students with the opportunity, with the guidance of a faculty member, to integrate and synthesize knowledge gained throughout their program of study. The project topic will be selected to include some aspects of the student's area of interest or specialization. Students will work with an ongoing research team working alongside researchers in implementing a phase of their research project. The requirements include a written paper and an oral presentation of the project outcomes. Students registered in HLSC 4998U must register in HLSC 4999U to receive a grade. 3 cr. Prerequisites: HLSC 3805U, HLSC 3910U, permission of instructor.

HLSC 4999U Research Practicum II. A continuation of the project started in HLSC 4998U. Students will make presentations based on their research and submit written work. Prerequisite: HLSC 4998U. Note: Students are expected to take this course immediately after HLSC 4998U.

INFR 1010U Discrete Mathematics. This course addresses the following topics: sets and set operations, propositional logic, predicate logic, rules of inference; methods of proof and reasoning, modular arithmetic, counting, pigeon-hole principle, induction, deduction, relations, functions, graphs, graph algorithms, shortest path, trees, combinatorics; applications to cryptosystems, hashing functions, coding. 3 cr, 3 lec, 1.5 tut.

INFR 1015U Linear Algebra and Physics for Games. This course introduces students to the core fundamentals behind the linear algebra and physics concepts necessary for game development. Concepts include vectors, matrices, rotations, quaternions, forces, velocity, and accelerations amongst others. Special topics such as number representation are also covered. The students will gain enough knowledge and practice to develop their own basic 3D Physics Engine. 3 cr, 3 lec, 1.5 tut. Prerequisite: INFR 1100U.

INFR 1016U Introductory Calculus. In this introductory calculus course, first characteristics, classes, and limits of various functions, including periodic and exponential functions, are discussed. The fundamental focus of the course is on the derivative of functions and rules of differentiation as well as the integral, rules, methods, and applications of integration. A brief overview of complex numbers is also discussed. 3 cr, 3 lec, 1.5 tut. Cross-listed: BUSI 1916U. Credit restriction: MATH 1000U, MATH 1010U.

INFR 1100U Introduction to Programming. This course introduces students to general computer programming principles, logics and problem solving skills. Topics include data types, variables, operators, expression, statements, blocks, control flow statements, functions (routines), arrays, pointers, and basic concepts of structures. The course uses a programming language such as C or C++ for illustrating the principle programming concepts. 3 cr, 3 lec, 1.5 tut. Credit restriction: ENGR 1200U.

INFR 1300U Creative Writing and Narrative Concepts. This course introduces the concepts of creative writing and narration in relation to game creation. 3 cr, 3 lec.

INFR 1310U Graphic Design I. This is an introduction to the fundamental concepts for drawing, visual image creation, colouring and lighting perspective. 3 cr, 3 lec.

INFR 1320U Graphic Design II. This course introduces the history, current technology, and design principles of graphic design and presents an overview of the basic formal elements and principles of two-dimensional design, and visual and creative thinking strategies. 3 cr, 3 lec, 1.5 tut. Prerequisite: INFR 1310U.

INFR 1340U Business of Gaming. This course provides an overview of game production cycles, preparation of user documentation, writing of strategic game playing, business models, development resource and models, legal issues, and other related topics. 3 cr, 3 lec.

INFR 1350U Introduction to Computer Graphics (formerly Photographic and Image Processing Techniques). This course introduces the fundamental knowledge of colour and light covering the various processes on how colour images are captured and recorded in chemical and digital imaging systems. Students will learn ways to manipulate various project components in the production and post-production process using an imaging system. This course helps students develop an understanding of the methods appropriate to research in colour imaging. Students will study methods for image acquisition and reproduction in the context of production systems. 3 cr, 3 lec, 3 tut. Prerequisite: INFR 2140U.

INFR 1395U Game Development Workshop I. The Game Development Workshop provides students with the opportunity to hone their game development skills by working on a year/semester-long game-related project. This project requires the students to utilize concepts taught in each game development course to build a complete game appropriate for their skill level. 0 cr, 3 lec.

INFR 1396U Game Development Workshop II. The Game Development Workshop provides students with the opportunity to hone their game development skills by working on a year/semester-long game-related project. This project requires the students to utilize concepts taught in each game development course to build a complete game appropriate for their skill level. 0 cr, 3 lec.

INFR 1410U Basics of Networking, Routers and Routing. This course is a combination of the Cisco Academy Program CCNA1 and CCNA2 covering the following topics: Computer hardware and software, electricity, networking terminology, and protocols; LANs and WANs, Open System Interconnection (OSI) model, Ethernet, and Internet Protocol (IP) addressing, design and documentation of a basic network and structured cabling, and network-to-network communications; Router user interfaces, components and configuration, basics of IOS versions, naming and software backup, TCP/IP Protocol Suite and IP addressing and subnetting, and Internet routing protocols – RIP, IGRP. 3 cr, 3 lec, 3 lab.

INFR 1411U Introduction to Networking I. This course introduces students to the fundamentals of networking and routers and helps them gain both the conceptual and practical skills. The following topics are covered: principles of communication and computer networking, Internet applications and architecture, networking terminology and protocols; LANs and WANs, Open System Interconnection (OSI) and TCP/IP models, Ethernet, Internet Protocol (IP) addressing and subnetting, VLSM and CIDR, Physical media and cabling, design and documentation of a basic network, Router user interfaces, components and configuration, basics of IOS, Distance-vector and link-state routing algorithms, Introduction to RIP, RIPv2, EIGRP and OSPF routing protocols. This course includes very intensive lab work based on Cisco CCNA Exploration 1 and 2 curriculum. 3 cr, 3 lec, 3 lab.

INFR 1420U Switching Basics, Intermediate Routing, and WAN Technologies. This course is a combination of the Cisco Academy Program CCNA3 and CCNA4 covering the following topics: Switching and VLANs, spanning-tree protocol, routing and routing protocols, access control lists (ACLs), and network documentation, security and troubleshooting; WAN devices, encapsulation formats, and communication, PPP components, session establishment, and authentication, ISDN uses, services, and configuration, frame relay technology and configuration. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 1410U.

INFR 1421U Introduction to Networking II. This course continues the INFR1410U course on the fundamentals of networking by focusing on LAN and WAN design and protocols. The following topics are covered: principles of LAN design, LAN switching and VLANs, VLAN Trunking and VTP, spanning-tree protocol, basic wireless LAN concepts, introduction to WANs, PPP, frame relay, security and access lists, teleworker services, NAT, DHCP, network troubleshooting. This course includes very intensive lab work based on the Cisco CCNA Exploration 3 and 4 curricula. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 1410U or INFR 1411U.

INFR 1500U Information Technology. IT: principles, state-of-the-art, opportunities, and trends; IT applications: science, engineering, and daily life; computer hardware: I/O devices, semiconductor memory, secondary storage devices, CPU, peripheral equipment; computer software: application and system software, including operating systems, utilities; web browsers; Internet, wired and wireless media, networks, and architectures; IT design criteria (complexity, performance) and constraints (costs, regulations, schedules). 3 cr, 3 lec. Credit restriction: ENGR 1400U.

INFR 1550U Law & Ethics of IT. This course provides an overview of topics related to legal, ethical and social issues arising from the use of information technology. It also covers areas such as cybercrime, privacy, intellectual property and equitable access. Topics to be covered include an overview of ethics, ethics for IT professionals and IT users, computers and internet crimes, privacy, freedom of expression, intellectual property, and the code of ethics and professional conduct. 3 cr, 3 lec.

INFR 2140U Object Oriented Programming. Based on the introduction to programming course, the fundamental concepts and techniques of object-oriented programming is introduced and explored in this course. To learn the fundamental concepts and techniques behind object-oriented programming in C++ or Java. They include: abstract data types (classes, objects, and methods); creation, initialization, and destruction of objects; class hierarchies and inheritance; polymorphism and dynamic binding. In addition, generic programming using templates and algorithm abstraction will also be discussed. 3 cr, 3 lec, 1.5 tut. Prerequisite: INFR 1100U. Cross-listed: BUSI 3540U.

INFR 2310U Computer Animation: Algorithms and Techniques. This course introduces students to the concepts underlying computer animation and provides students with a solid basis of animation concepts for game development. Topics include traditional animation techniques, spline animation, interpolation and advanced level contents focusing on theoretical aspects of animation development. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 1015U, INFR 2140U, INFR 1320U.

INFR 2330U Game Design and Production I. This course introduces the concepts behind game design and production. Topics include story vs. narrative, character development, design documentation, idea formation, prototyping and the game production pipeline. Students will be required to utilize an existing game engine to develop a prototype. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 1300U, INFR 1320U, INFR 2140U.

INFR 2350U Intermediate Computer Graphics. The basic concepts, tools and techniques of computer graphics are described, and the fundamental transformations of scaling, translation, rotation, windowing, hidden line removal, image processing and clipping are presented. Mathematical tools needed for the geometrical aspects of computer graphics are discussed. Particular emphasis will be placed on new developments in microcomputer graphics. Students will be expected to develop a graphics application using either C++ and/or other programming language with available graphics libraries. 3 cr, 3 lec, 3 tut. Prerequisites: INFR 1350U.

INFR 2370U Sound and Audio. This course is an introduction to digital sound and audio concepts and their applications in multimedia production. It introduces students to the concepts of programming with sound and audio data. Throughout the course students will apply the theoretical concepts in gaming related programming projects. It presents an overview of gitter, dither and word lengths, high sample rates, distortion, headroom, monitor calibration, metering, depth perception, compression and expansion, equipment interconnection and other digital audio related topics. 3 cr, 3 lec, 3 tut. Prerequisite: INFR 2140U.

INFR 2395U Game Development Workshop I. The Game Development Workshop provides students with the opportunity to hone their game development skills by working on a year/semester-long game-related project. This project requires the students to utilize concepts taught in each game development course to build a complete game appropriate for their skill level. 0 cr, 3 lec.

INFR 2396U Game Development Workshop II. The Game Development Workshop provides students with the opportunity to hone their game development skills by working on a year/semester-long game-related project. This project requires the students to utilize concepts taught in each game development course to build a complete game appropriate for their skill level. 0 cr, 3 lec.

INFR 2410U Advanced Routing and Remote Access. This course is a combination of the Cisco Academy Program CCNP1 and CCNP2 covering the following topics: selecting and configuring scalable IP addresses, implementing technologies to redistribute and support multiple, advanced, IP routing protocols such as OSPF, EIFRP, and BGP, configuring access lists, designing and testing edge router connectivity into a BGP network; configuring asynchronous connections, point-to-point Protocol (PPP) architecture, protocol, callback, and compression, ISDN architecture, protocol layers, BRI and DDR, configuring X.25, frame relay and AAA. 3 cr, 4 lec, 3 lab. Prerequisite: INFR 1420U.

INFR 2411U Advanced Networking I. This course teaches students how to implement, monitor, and maintain routing services in an enterprise network. Students will learn how to plan, configure, and verify the implementation of complex enterprise LAN and WAN routing solutions, using a range of routing protocols in IPv4 and IPv6 environments. The course also covers the configuration of secure routing solutions to support branch offices and mobile workers. Comprehensive labs emphasize hands- on learning and practice to reinforce configuration skills. 3 cr, 3 lec, 3 lab, 2 tut. Prerequisite: INFR 1420U or INFR 1421U.

INFR 2420U Multilayer Switching. This course is a combination of the Cisco Academy Program CNNP3 and CCNP4 covering the following topics: fast Ethernet, gigabit Ethernet, VLAN basics, types, identification, and trunking protocol, spanning tree protocol, MLS processes, and configuration, multicasting protocols, routing, and tasks; troubleshooting in OSI layers 1, 2, and 3, TCP/IP,LAN switching, VLANs, frame relay, ISDN, Appletalk, Novell, EIGRP, OSP, BGP. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 2410U.

INFR 2421U Advanced Networking II. This course teaches students how to implement, monitor, and maintain switching in converged enterprise campus networks. Students will learn how to plan, configure, and verify the implementation of complex enterprise switching solutions. The course also covers the secure integration of VLANs, WLANs, voice, and video into campus networks. Comprehensive labs emphasize hands-on learning and practice to reinforce configuration skills. 3 cr, 3 lec, 3 lab, 2 tut. Prerequisite: INFR 2411U

INFR 2430U Network Troubleshooting. This course is part of the Cisco Academy Program CCNP4 covering the following topics: fast Ethernet, gigabit Ethernet, VLAN basics, types, identification, and trunking protocol, spanning tree protocol, MLS processes, and configuration, multicasting protocols, routing, and tasks; troubleshooting in OSI layers 1, 2, and 3, TCP/IP, LAN switching, VLANs, frame relay, ISDN, Appletalk, Novell, EIGRP, OSP, BGP. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 2420U.

INFR 2431U Advanced Networking III. This course teaches students how to monitor and maintain complex, enterprise routed and switched IP networks. The scope of the course is focused on planning and execution of regular network maintenance, as well as support and troubleshooting using technology-based processes and best practices, in a systematic approach. Extensive labs emphasize hands-on learning and practice to reinforce troubleshooting techniques. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 2411U and INFR 2421U.

INFR 2470U CISCO Security I: Fundamentals of Network Security. This is part of the Cisco Fundamentals of Network Security that introduces students to design and implement security solutions that will reduce the risk of revenue loss and vulnerability. Topics include: security policy design and management; security technologies, products and solutions; firewall and secure router design, installation, configuration and maintenance; AAA implementation using routers and firewalls; and VPN implementation using routers and firewalls. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 1420U.

INFR 2480U CISCO Security II: Network Security. This is a continuation of the Cisco Security I course, covering security technologies on voice and data communications, wireless LANs, and other related networking technologies. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 2470U.

INFR 2600U Introduction to Computer Security. Introduces the theoretical foundations of IT security. Topics include: fundamental concepts of IT security, vulnerabilities and associated risks, security models, authentication, authorization and accounting (AAA), identity and access control, object protection (granularity, reuse), cryptography, design principles for secure systems, trusted computing base, separation/isolation/virtualization, malicious logic, logging and auditing, intrusion detection, information security management. 3 cr, 3 lec. Prerequisite: INFR 1010U.

INFR 2610U OS Security I: Windows. This course is a definitive security study on Microsoft operating systems, servers, clients, networks, and Internet services. It covers comprehensive security operations and deployment information, along with security tools availableon the web. 3 cr,3 lec, 3 lab. Corequisite: INFR 2830U.

INFR 2620U OS Security II: Unix. This course is a definitive security study on Unix operating systems, servers, clients, networks, and Internet services. It covers comprehensive security operations and deployment information, along with security tools available on the web. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 2830U.

INFR 2810U Computer Architecture. Computer systems generation: main-frame, mid-range, microcomputers; peripherals and interfaces; bus design; input/output systems and technologies; central processing units: arithmetic logic and control units; semiconductor memory (RAM and ROM), magnetic disks and tapes, optical disks; assembly and high-level programming language; integer and floating point arithmetic, pipelining and parallelism; CISC vs. RISC. 3 cr, 3 lec, 1.5 tut. Prerequisite: INFR 1100U.

INFR 2820U Algorithms and Data Structures. This course presents an overview of fundamental theories and knowledge in data structures and the associated algorithms. This course introduces the concepts and techniques of structuring and operating on abstract data types in problem solving. In addition, this course also discusses sorting, searching and graph algorithms, and the complexity and comparisons among these various techniques in computing and software development. 3 cr, 3 lec, 1.5 tut. Prerequisites: INFR 1010U or INFR 1015U or INFR 1016U, INFR 2140U.

INFR 2830U Operating Systems. This course presents an overview of operating systems from the structure, performance, and design of operating systems. This course also covers the basic concepts of various operating systems, specifically Windows and Unix. 3 cr, 3 lec, 3 tut. Prerequisite: BUSI 1830U or INFR 1100U.

INFR 3110U Game Engine Design and Implementation (formerly Game Programming). This course presents the game programming techniques, ideas, and solutions for game programmers and introduces various programming techniques used in game engine development. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 2310U, INFR 2330U, INFR 2350U, INFR 2370U, INFR 2820U.

INFR 3120U Web and Script Programming. This course covers the design of client-side and server-side web applications and scripting languages such as JavaScript, VBScript, ActiveX, PHP, Perl, Python, Ruby, as well as shell programming. The topics include structure, syntax, and presentation format in various scripting languages, as well as applications of scripting for network and system administrators. 3 cr, 3 lec, 1.5 tut. Prerequisite: INFR 2140U.

INFR 3310U Animation and Production. This course provides students with solid conceptual and critical graphics and animation skills through a combination of technical explanations and creative techniques. This course covers the creation of high quality animations and effects suitable for video games using the latest hardware and software techniques. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 2310U.

INFR 3320U Filmmaking. This course presents an overview of the history and art of film with respect to lighting, layout, cinematography, screen direction and character studies. It introduces the preproduction processes of storyboarding the production of leica reels in the critical development of project concepts, and produces in combination of both traditional and digital process. Production processes, studio roles, editing and post-production will be addressed. 3 cr, 3 lec, 3 tut. Prerequisite: INFR 1300U and year three standing in Game Development specialization.

INFR 3330U Game Design and Production II. This course extends the students knowledge of concepts behind game design and production. Topics include story vs. narrative, design documentation, idea formation, prototyping, game testing and the game production pipeline. Students will be required to utilize an existing game engine to develop a prototype. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 2330U.

INFR 3340U Intermediate Modelling Techniques (formerly Intermediate Animation Techniques). This course introduces the fundamental knowledge of developing 3D models using computer software. Topics include character modelling and bones, designing joints and creating chains with constraints for easy animation, facial modelling and lip sync, designing faces with economical splinage to simplify facial animation, breaking down voice tracks into phonemes and animating facial and body language to match the track. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 2310U.

INFR 3395U Game Development Workshop I. The Game Development Workshop provides students with the opportunity to hone their game development skills by working on a year-/semester-long game-related project. This project requires the students to utilize concepts taught in each game development course to build a complete game appropriate for their skill level. 0 cr, 3 lec.

INFR 3396U Game Development Workshop II. The Game Development Workshop provides students with the opportunity to hone their game development skills by working on a year-/semester-long game-related project. This project requires the students to utilize concepts taught in each game development course to build a complete game appropriate for their skill level. 0 cr, 3 lec.

INFR 3600U Cryptography and Network Security. This course covers diverse topics on cryptography and network security. In the cryptography field, students will be exposed to the introductory theory behind symmetric and public-key cryptography, including digital signatures, hash functions, and authentication. The network security section of the course includes topics on authentication, Web security, intruders and firewalls. 3 cr, 3 lec. Prerequisites: INFR 1010U, INFR 2600U.

INFR 3610U Operating System Security. This course discusses security solutions for two major Operating Systems: Windows and Unix/Linux. It will cover client/server operation, networking aspects from an OS perspective, as well as Internet services as provided through the OS. It covers comprehensive security operations and deployment information, along with security tools available on the web. 3 cr, 3 lec, 3 tut. Prerequisites:, INFR 2600U, INFR 3820U.

INFR 3710U Signals and Random Processes. This course covers: i) basics of complex numbers, as well as fundamentals of calculus with an emphasis on integrals, ii) signals and systems classifications; linear, time-invariant systems, impulse response and convolution; Fourier series and Fourier transforms; frequency response and bandwidth, and iii) random variables, probability density and distribution function; Gaussian variables, the central limit theorem, random processes, correlation and spectra of random signals and additive white Gaussian noise. 3 cr, 3 lec, 1.5 tut. Prerequisite: INFR 1016U.

INFR 3720U Basics of Digital Transmission. Introduces the digitization: filtering, sampling, quantization, A-to-D and D-to-A conversion, line coding; fundamentals of source and channel coding; multiplexing: TDM, FDM, WDM; baseband and passband systems; modulation: pulse modulation (PAM, PPM, PDM) and digital modulation (binary and M-ary transmission); Nyquist-I criterion and intersymbol interference; adaptive equalization; power, bandwidth, performance, and complexity trade-offs; digital communication systems; 3 cr, 3 lec, 1.5 tut. Prerequisite: INFR 3710U.

INFR 3730U Multimedia Systems. Theory, features, design, performance, complexity analysis and application of multimedia engineering technologies; digital signal compression: audio, image, video, characterization, compression requirements; source entropy and hybrid coding, transform and wavelet based coding; motion estimation; object-based processing, and multimedia indexing and retrieval. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 1010U, INFR 2140U.

INFR 3810U Database Systems. This course introduces the field of database systems for students with a basic knowledge of storage and file management capabilities of a modern computer system and features of one or more high-level programming language. Coverage includes general concepts, the relational model, theory and practice of database design, transaction management, how relational concepts are relevant to other aspects of database technology, and the impact of object technology on database systems. It also covers security issues of database systems, including disaster recovery and network intrusion. 3 cr, 3 lec. Prerequisites: BUSI 1830U or HLSC 2201U or INFR 1100U.

INFR 3820U Operating System Management. This course introduces system management principles for two major Operating Systems: Windows and Unix/Linux. It will cover system setup and configuration, system administration, client/server operation, networking aspects from an OS perspective, as well as Internet services as provided through the OS. It complements the discussion of system management with information, along with system management tools available on the web. 3 cr, 3 lec, 3 tut. Prerequisite: INFR 2830U.

INFR 3830U Distributed Systems and Networking (formerly Distributed Computing). Network history and architectures; reference Model for Open Systems Interconnection (OSI): descriptions, examples, and applications; routing, multicast deliver; TCP/IP protocol suite; network topologies (ring, bus, tree, star, mesh);

local area networks, WAN, wireless networks, the Internet: P2P networking, distributed computing models. 3 cr, 3 lec. Prerequisites: INFR 2140U, INFR 2810U, INFR 3110U.

INFR 3850U Enterprise Network Management. This course provides students with knowledge and skills to design and manage an enterprise network. Topics include: Enterprise network planning, Windows and Unix server installation, configuration and administration, Enterprise network applications, virtualization, clustering concepts, data centre operations, storage networks, Introduction to network management protocols, enterprise security planning, and disaster recovery methods. 3 cr, 3 lec, 3 tut. Prerequisites: INFR 2421U, INFR 2830U.

INFR 4310U Multiplayer and Online Game Development. This course introduces the design, development, and management of online, multi-user and massive multi-user games. It covers the technological and business aspects of Internet game development, and presents an overview of the current Internet game industry. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 3330U, INFR 3830U.

INFR 4320U Artificial Intelligence for Gaming. This course introduces key AI game programming issues and provides ideas and techniques to be integrated into games development. It also presents an overview of AI architecture, rule based systems, level of detail AI and script language issues, expert systems, fuzzy logic, neural networks, and genetic algorithms. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 3110U, INFR 3310U.

INFR 4340U Business of Gaming. This course provides an overview of game production cycles, preparation of user documentation, writing of strategic game playing, business models, development resource and models, legal issues, and other related topics. 3 cr, 3 lec.

INFR 4350U Virtual Reality and User Interaction (formerly Immersive Environments, Virtual Reality). Virtual reality is a very powerful and compelling computer application by which humans interact with computer-generated environments in a way that mimics real life and engages various senses. This course provides an overview of current virtual reality technology and its applications and presents an analysis of the engineering, scientific, and functional aspects of virtual reality systems and the fundamentals of VR modelling and programming. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 3330U.

INFR 4390U Demo Reel Development. This course is project-based. Students are required to develop a series of projects as approved by the faculty resulting in a high quality demo reel and portfolio. 3 cr, 3 lec. Prerequisites: Year four standing in Game Development specialization.

INFR 4391U Special Topics in Game Development and Entrepreneurship. This course will compose of selected topics of current interest in game development and entrepreneurship. 3 cr, 3 lec. Prerequisite: Year four standing in Game Development specialization or permission of instructor.

INFR 4395U Game Development Workshop I. The Game Development Workshop provides students with the opportunity to hone their game development skills by working on a year/semester-long game-related project. This project requires the students to utilize concepts taught in each game development course to build a complete game appropriate for their skill level. 0 cr, 3 lec.

INFR 4396U Game Development Workshop II. The Game Development Workshop provides students with the opportunity to hone their game development skills by working on a year/semester-long game-related project. This project requires the students to utilize concepts taught in each game development course to build a complete game appropriate for their skill level. 0 cr, 3 lec.

INFR 4410U Routing/Switching and Service Providers. This is the first CCIE series course to prepare students for the CCIE examination. This covers expert level knowledge of networking across various LAN and WAN interfaces and a variety of routers and switches. The course presents ways to solve complex connectivity problems and apply technology solutions to increase bandwidth, improve response times, maximize performance, improve security, and support global applications. The course covers expert level knowledge and skill in the fundamentals of IP and core IP technologies such as uncast IP routing, QoS, multicast, MPLS, MPLS VPNs, traffic engineering, multiprotocol BGP,etc. as well as specialized knowledge in at least one of the networking areas specific to service providers. 3 cr, 3 lec, 6 lab. Prerequisite: INFR 2421U.

INFR 4420U Security. This course is the second in the CCIE series to prepare students for the CCIE examination. This course covers expert level knowledge and skill in configuring and maintaining secure networks. CCIE Security certified individuals are experts in the fundamentals of IP and IP routing, as well as the specific area of security protocols and applications. 3 cr, 3 lec, 6 lab. Prerequisite: INFR 4410U.

INFR 4430U Voice. This course covers the foundational topics of VoIP design and implementations in a SOHO environment. Topics include VoIP fundamentals, VoIP design elements, VoIP routing, call signaling, gateways and gatekeepers, dial plans and digit manipulation. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 2431U.

INFR 4550U Law and Ethics of IT. This course provides an overview of topics related to legal, ethical, and social issues arising from the use of information technology. It also covers areas such as cybercrime, privacy, intellectual property, and equitable access. 3 cr, 3 lec. Prerequisite: Year three standing in Networking and IT Security specialization.

INFR 4590U Directed Independent Studies in Information Technology. This course is an independent study in selected IT topics supervised by an IT faculty member. This course is normally intended for students who intend to pursue graduate study. 3 cr. Prerequisite: Permission of instructor.

INFR 4599U Special Topics in Information Technology. This course will be comprised of selected topics of current interest in information technology. 3 cr, 3 lec. Prerequisite: Permission of instructor.

INFR 4610U IT Security. This course introduces the concepts and applications of IT security and provides students with the knowledge in exploring the new nature of IT-related threats. The course will provide both technological and social aspects of IT security. 3 cr, 3 lec. Prerequisites: INFR 2430U and completion of all 3000-level required courses.

INFR 4620U Emerging IT Security Technologies. This course presents the current trends on research and development in IT security technologies and discusses issues and standards from a technological and management perspective as they relate to the management of large networking systems and computer environments. The course also provides an in-depth examination of IT security hardware and software choices deals with the need to tailor networking operating systems to fit a corporation's enterprise networks. 3 cr, 3 lec. Prerequisite: INFR 3850U.

INFR 4630U Malware Worms and Viruses. This course presents different types of malware, such as viruses, worms, malicious code delivered through web browsers and e-mail clients, backdoors, Trojan horses, user-level Root Kits, and kernel-level manipulation. The course covers characteristics and methods of attack, evolutionary trends, and how to defend against each type of attack. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 2140U, INFR 2610U, INFR 2620U.

INFR 4640U Web Services Security. This course presents an overview of web services architecture and issues related to its security. It also introduces ways to build a secure web services system and covers security technologies used for providing secure web services, emphasizing how security works with XML and SOAP. 3 cr, 3 lec, 2 lab. Prerequisite: INFR 3120U.

INFR 4650U VPN and Data Privacy. This course introduces the development, implementation, and maintenance of Virtual Private Networking (VPNs). Covers topics such as User Authentication and QOS, deployment levels, tunnelling protocols, service level guarantees, and traffic management. Discusses issues on weaving VPN technology into overall information technology infrastructure and study how VPNs facilitate e-commerce, as well as intraorganizational networking. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 2480U, INFR 2830U.

INFR 4660U Web Services and E-Business Security (formerly E-Business Security). This course presents an overview of the state-of-the-art in e-business security. It examines the most recent attack strategies and offers specific technologies and techniques for combating attempts at data infiltration, destruction, and denial of service attacks. Taking the view that security must be incorporated within multiple levels of e-business technology and practice, the course presents measures for securing system platform, applications, operating environment, processes, and communication links. It shows how the traditional security technologies of firewalls and Virtual Private Networks (VPNs) can be integrated with risk management, vulnerability assessment, intrusion detection, and content management for a comprehensive approach to security. 3 cr, 3 lec. Prerequisites: INFR 2820U, INFR 3810U.

INFR 4670U Malware & Software Security. This course provides a comprehensive study of malicious software (malware), its detection, and its prevention. It explores what vulnerabilities can be exploited by malware (and how), how to identify malware, reverse engineering and debugging, how anti-virus (and other security software) works to detect and remove malware, and how advanced malware tries to evade detection (e.g., obfuscation and encryption). Techniques for preventing and detecting vulnerabilities prior to software release are also covered (e.g., secure programming techniques). 3 cr, 3 lec. Prerequisites: INFR 3600U, INFR 3610U.

INFR 4680U IT Security Policies and Procedures. The objective of this course is to provide an understanding of the need for the multi-disciplinary involvement, an understanding of where this involvement fits into the policy development life cycle and a methodology that provides a means of implementing this development life cycle into an organization. The course discusses how the policy development process should be something that requires the involvement of key business decision makers of which information security is only one. 3 cr, 3 lec. Prerequisite: BUSI 3501U or INFR 4550U.

INFR 4690U IT Forensics. In this course, students will learn how to create an incident response plan and implement a computer forensics incident-response strategy, and conduct a proper computer forensics investigation. This course is composed of five parts: 1) basics, which includes the brief introductions of needed knowledge for this course, such as File System Structures and Metadata, FAT/NTFS/Ext2/Ext3 File System Essentials, Imaging digital media, TCP/IP and networking fundamentals, system administration basics, and information-hiding techniques; 2) computer forensics and investigation, which introduces how to conduct a proper computer forensics and investigation; 3) incident response, which introduces how to create an incident response plan and implement a computer forensics incident response strategy; and 4) case studies, which are completed in teams and one team per case will present their analysis and solution to the class (e.g. in PowerPoint) as it would be done as investigators. 3 cr, 3 lec, 3 tut. Prerequisites: INFR 2420U or INFR 2421U, INFR 3600U, INFR 3610U.

INFR 4750U Advanced Communication Networks. Networks are the essential components to information transmission, without which there are no communications. This course presents telecommunications networks fundamentals, and emphasizes advanced topics and detailed network architectures. The course gives detailed descriptions of the principles associated with each layer, as well as the analytical framework of each level and highlights many examples drawn from the Internet and wireless networks. This course analyzes various wireless systems. In this course, all major aspects of transmission systems and theoretical foundations of computer and communications networks, as well as networking principles will be analyzed and discussed in detail. 3 cr, 3 lec, 3 lab. Prerequisite: INFR 3720U.

INFR 4760U Network Performance Analysis. This course arms students with theoretical and practical skills for performance analysis of communication networks. Students will learn the foundations of network analysis, main performance parameters, basic queuing theory and network modeling and simulation, and then apply this knowledge to a wide range of networking problems such as network design, traffic flow optimization and congestion control. 3 cr, 3 lec, 3 lab. Prerequisites: INFR 2431U, INFR 3710U.

LGLS 2100U Public Law. This course is an introduction to the law relating to the state and its relationships, including the constitutional fundamentals of the Canadian legal and political system. It examines the structure of the Canadian constitution, the Canadian Charter of Rights and Freedoms, federalism and division of powers, judicial review and Aboriginal and treaty rights. The course also includes an analysis of basic principles in administrative law, as well as a consideration of the role of law in public policy. The legislative and common law foundations of public law will also be introduced. 3 cr, 3 lec. Prerequisite: SSCI 1010U. Credit restriction: LGLS 3120U.

LGLS 2120U International Law (formerly LGLS 3120U). International Law will introduce students to the key topics of public international law, including sources and subjects of public international law, the law of international treaties, state responsibility, use of force, self-determination, international human rights and international criminal law. The course will examine the functioning of the UN and some regional systems of human rights and international criminal law enforcement, such as the European Court of Human Rights, the International Criminal Court, International Criminal Tribunals for Rwanda and former Yugoslavia. 3 cr, 3 lec. Prerequisite: SSCI 1010U. Credit restriction: LGLS 3120U.

LGLS 2200U Legal Theory. This course is a general introduction to legal theory. Some of the topics that may be covered include legal positivism, natural justice, critical legal theory, normative theory, sociological theories of law, feminist legal scholarship, legal pluralism and Marxian theories of law. The intention of this course is to give the student an appreciation for the range and power of theoretical perspectives in legal studies. 3 cr, 3 lec. Prerequisite: SSCI 1010U.

LGLS 2300U Commercial and Contract Law. This course covers the basic concepts and underlying principles of the law of a contract from the establishment of a contract to remedies for breach of a contract. The application of the role of a contract and the enforcement of promises and agreements to commercial and social arrangements will be considered. Beyond contract further commercial topics which may be covered include risk management and liability as well as the legal regulatory and administrative context of commercial activity. 3 cr, 3 lec. Prerequisite: SSCI 1010U.

LGLS 2420U Canadian Human Rights Law (formerly LGLS 3420U). The course will examine Canada's international obligations under human rights treaties as well as the structure of domestic human rights protection mechanisms. Among the topics discussed are international human rights treaties to which Canada is a party, federal and provincial human rights codes, decisions of international human rights bodies concerning Canada and decisions of Canadian courts involving internationally recognized human rights. The course will pay close attention to the roles of law and social attitudes in respecting and enforcing human rights, as well as to balancing individual human rights and national interests (e.g. deportation of terrorist suspects to countries where they may be subjected to torture). 3cr, 3 lec. Prerequisite: SSCI 1010U.

LGLS 2500U Information and Privacy Law (formerly LGLS 3500U). Information and privacy law examines two intersecting yet separate areas of law: privacy law and information law. The privacy law portion of the course will consider the privacy rights protected by the *Charter of Rights and Freedoms,* public and private sector legislation such as the *Privacy Act* and the *Protection of Personal Information and Electronic Documents Act (PIPEDA),* and the development of other causes of action addressing invasion of privacy by individuals. The information law portion will address the principles of open government and open justice, along with analysis of access to information legislation. The interplay between the two areas of law will be a persistent theme throughout the course. 3 cr, 3 lec. Prerequisite: SSCI 1010U.

LGLS 2940U Legal Research Methods. The objective of this course is to have the student gain basic Legal Research skills that can be applied to any legal problem, as well as acquire a critical understanding of research methods used in the interdisciplinary field of Legal Studies. The student will learn traditional methods of legal research, such as locating and interpreting relevant case law and legislation, as well as research skills for placing legal issues in a broader social context. The students will also be exposed to a variety of social science and humanities research methods that inform the field of Legal Studies. 3 cr, 3 lec. Prerequisite: SSCI 1010U.

LGLS 3100U Administrative Law. This course will introduce students to the body of law that governs administrative decision-making in a variety of areas, including immigration, human rights, labour relations, business regulation, land use planning, information and privacy and others. It will explore the rules and principles governing administrative decision-making (rights of individuals concerned, independence and impartiality of decision-makers, administrative discretion), principles of their judicial oversight (scope and standards of review) and remedies available. 3 cr, 3 lec. Prerequisite: LGLS 2940U.

LGLS 3110U Constitutional Law. The course introduces students to the constitutional fundamentals of the Canadian legal and political system. It examines the structure of the Canadian constitution, the Canadian Charter of Rights and Freedoms, federalism and division of powers, judicial review and Aboriginal and treaty rights. 3 cr, 3 lec. Prerequisite: LGLS 2940U.

LGLS 3130U Family Law. This course provides the basis for understanding legal and policy-based regulation of the family and familial relations. It will focus on the regulation of familial relations at three major points: the formation of family, its on-going functioning and its dissolution. Among the topics examined are common-law unions, marriage, divorce, adoption, custody, spousal support, dispute resolution and others. The impacts of socio-cultural norms about family life on family law, as well as issues of race, gender and sexual orientation will be discussed. This course is essential for students who intend to pursue a minor in mediation. 3 cr, 3 lec. Prerequisite: LGLS 2940U.

LGLS 3140U Tort Law. In this course the student will examine the nature of tort law and how plaintiffs can sue for damages from harm. Tort law deals with civil harm or injury that is not covered by breach of contract. The course also covers the relationship between civil fault based redress for harm and no-fault systems in the legal system and in various public and private bureaucratic arrangements, including: compensation for victims of crime and workers' compensation. Questions of liability and risk in public institutions and in the criminal justice system also receive attention. 3 cr, 3 lec. Prerequisite: LGLS 2940U.

LGLS 3200U Sociology of Law. This course examines the various philosophies, theories, and perspectives that form the theoretical underpinnings of a sociological understanding of law. The focus includes perspectives influenced by classical and contemporary (including feminist, critical race and post-colonial) theorists. These theoretical perspectives will be applied to understanding the social dynamics of law, legal professions and the legal system. 3 cr, 3 lec. Prerequisite: LGLS 2200U or SSCI 2830U.

LGLS 3210U Psychology of Law. This course is an overview of theory and research in the field of psychology and law. Psychological principles drawn from a variety of sub-disciplines (e.g. social, clinical, cognitive, developmental) are surveyed in terms of their relevance and application to the legal system. This course focuses on issues such as jury decision making, eyewitness testimony, insanity defence, detection of lies, confessions, repressed and recovered memories, child witnesses and the role of psychologists as expert witnesses. 3 cr, 3 lec. Prerequisites: LGLS 2200U or SSCI 2830U, PSYC 1000U.

LGLS 3220U Philosophy of Law. This course examines the various philosophies, theories, and perspectives that form the theoretical underpinnings of a sociological understanding of law. The focus includes perspectives influenced by classical and contemporary (including feminist, critical race and post-colonial) theorists. These theoretical perspectives will be applied to understanding the social dynamics of law, legal professions and the legal system. 3 cr, 3 lec. Prerequisite: LGLS 2200U or SSCI 2830U.

LGLS 3230U Law and Globalization. Law has been traditionally understood as a state-created and state-enforced phenomenon. However, recent developments across the globe challenge this view by drawing our attention to the role played by non-state actors (NGOs, international organizations, corporations, and transnational entities) in generating norms, and implementing international and transnational rules. This evidence suggests that states are 'disaggregating' and that their powers and immunities are being redistributed to these non-state actors, which are increasingly becoming centres of authority in their own right. This course will introduce students to theoretical perspectives on law and globalization and will assist them in developing an appreciation for the complexity of regulatory frameworks and patterns in today's world. Topics may include: state sovereignty and post-conflict reconstruction, economic regulation and international trade, migration, international justice and advocacy, security, and the impact of technological change. 3 cr, 3 lec. Prerequisite: LGLS 2200U or SSCI 2830U.

LGLS 3240U Cultural Studies of Law. This course explores cultural studies approaches to law. Part of the course will be dedicated to developments in legal scholarship, including law and literature, law and film, and law and popular culture. Students will become familiar with methods of reading cultural texts that deal with the law in various forms (such as courtroom dramas and legal thrillers, or texts dealing with divorce or other social phenomena which engage the law). Students will also study ways in which cultural studies scholars examine the law itself (such as cases or legislation), or place the law in a broader cultural context. 3 cr, 3 lec. Prerequisite: LGLS 2200U or SSCI 2830U.

LGLS 3300U Disability and the Law. This course examines disability from a human rights perspective. Students will be introduced to different theories and historical approaches to disability; domestic and national documents dealing with disability rights and mechanisms established to protect rights of disabled persons both nationally and internationally. The course will examine how law defines and treats disability in such contexts as employment, social assistance, medical treatment, criminal law, and education. 3 cr, 3 lec. Prerequisite: LGLS 2940U.

LGLS 3310U Aboriginal Issues and the Law. This course is an overview of the evolution of Canadian law as it relates to Aboriginal peoples, including the history of the Indian Act, treaty rights, Aboriginal rights under the Charter, legislative jurisdiction, self-government, and land claims. We will discuss the role of Aboriginal traditional jurisprudence in shaping Canadian law, and how law has been and continues to be used as an instrument of oppression against Aboriginal peoples in Canada. International aspects of indigenous rights and legal claims will be considered. 3 cr, 3 lec. Prerequisite: LGLS 2940U.

LGLS 3320U Race, Ethnicity and the Law. This course introduces students to the analysis of how racialized groups are treated in the Canadian justice system. This course examines the way that Canadian law has been used to ensure both difference and sameness of treatment of racialized and ethnic minorities. Students will examine litigation and legislation under the Charter, and critically consider the existence of structural discrimination. 3 cr, 3 lec. Prerequisite: LGLS 2940U.

LGLS 3330U Gender, Sexuality and the Law. This course examines gendered and sexual orientation inequities in the legal system, primarily through analysis of the legal regulation of sexuality, reproduction, and family relationships. The course approaches topics from a critical perspective. Specific topics may include legal regulation of: reproduction, birth control and abortion; sex work and other sexual activities; gender changing; pay equity and labour issues; marriage and divorce; child custody and adoption; survivor rights; and sexual orientation and gender-based violence. 3 cr, 3 lec. Prerequisite: LGLS 2940U.

LGLS 3410U Labour and Employment Law. This course will examine both collective and individual aspects of work relations; regulation of unionized labour force (labour law) and regulation of individual employment contracts (employment law). The labour law component of the course will examine collective bargaining, unionization, industrial disputes, regulation of strikes, lockouts and pickets. The employment law component of the course will examine the formation of an individual employment contract, rights and duties of employees and employers, termination of contracts. Pay equity, occupational health and safety, employment standards and human rights will be addressed as issues relating to both employment and labour law. Students will gain basic understanding of the Ontario Labour Relations Act, the Ontario Employment Standards Act, and the Ontario Human Rights Code. 3 cr, 3 lec. Prerequisite: LGLS 2940U.

LGLS 3430U International Human Rights. This course familiarizes students with major international and regional human rights documents, national implementation of human rights obligations, and the international bodies created to monitor the compliance of state parties to human rights treaties. Among the possible topics to be discussed are the rights to freedom from torture, as well as the controversial rights to food and democracy, and various cultural, economic, social, civil, and political rights. 3 cr, 3 lec. Prerequisite: LGLS 2940U. Corequisite: LGLS 2120U.

LGLS 3510U Censorship and Freedom of Expression. This course examines the legal tensions and social dynamics of censorship and freedom of expression. Some of the substantive areas that may be considered are: pornography, political expression, advertising as expression, and hate. The importance of Charter cases will be analyzed. 3 cr, 3 lec. Prerequisite: LGLS 2940U. Corequisite: LGLS 2500U.

LGLS 3520U Law and Technology (formerly Internet Law). New technologies engage the law in at least three ways: they may become the object of regulation; they may affect the application of the law to human interactions; and they may affect the procedural elements of the law (such as evidence law). The course will examine the ways that both historical and recent technological inventions engage and are engaged by the law. 3 cr. 3 lec. Prerequisite: LGLS 2940U. Corequisite: LGLS 2500U.

LGLS 3530U Intellectual Property. This course is an overview of the ever expanding and shifting intangible property at the centre of the information society. The course will address copyright, patent, trademarks, personality rights, and trade secrets. Students will examine the Canadian legal regime protecting and limiting protection of intellectual property, and place it in the context of the challenges wrought by internationalization and technological change. 3 cr, 3 lec. Prerequisite: LGLS 2940U. Corequisite: LGLS 2500U.

LGLS 3600U Family Mediation. This course examines conflict not only in the traditional two parent family situation but also in emerging single and same sex parented families. While the main focus will be on conflicts created during marriage breakdown, separation and divorce, emphasis will also be given to issues of intergenerational care and abuse both involving children and the elderly. Skills and forms of practice leading to the creation of parenting plans and separation agreements will be examined against the backdrop of the emotional, social and legal forces affecting the participants. Family relations mediation, family financial mediation and family comprehensive mediation with emphasis on the development of parenting plans will be considered. 3 cr, 3 lec. Prerequisites: LGLS 2940U, LGLS 3130U. Corequisite: SSCI 3040U.

LGLS 3610U Employment and Mediation. Mediation in employment involves conflicts relating to the negotiation of collective bargaining agreements, the conditions of employment and the grievance process that arise out of those agreements on an ongoing basis and require alternative self-determined, informal, dispute resolution processes in addition to the possibilities of arbitration or litigation. It may also involve the mediation of interpersonal disputes in the workplace. The student in this course will be expected to understand the legal framework of employment and will demonstrate an ability to create win-win solutions to typical conflicts in this area. 3 cr, 3 lec. Prerequisites: LGLS 2940U, LGLS 3410U. Corequisite: SSCI 3040U.

LGLS 3620U Human Rights Mediation. Human rights mediation looks at the way that mediation and alternative dispute resolution can be used in the context human rights complaints. Students will examine human rights mediation initiatives such as the Canadian Human Rights Commission and ways that mediation is used to divert disputes from the tribunal process. Students are also exposed to the ways that mediation is used in human rights disputes to resolve conflict and to educate parties to rights issues. The student in this course is expected to understand the legal framework of human rights and will demonstrate an ability to create win-win solutions to typical conflicts in this area. 3 cr, 3 lec. Prerequisites: LGLS 2940U. Corequisite: LGLS 2420U, SSCI 3040U.

LGLS 4098U Legal Studies Field Work Practicum. The purpose of this work practicum is to allow the student to work in situations where they may be later employed. They will have the opportunity to practice skills gained in prerequisite courses and receive feedback on their abilities. Arrangements for placement of the student will be made with relevant agencies, in keeping with the learning goals of the student and the program learning outcome requirements. The course includes seminars, one hundred hours of practical experience and daily journals of the fieldwork experience that form the basis of a self-evaluation and report. Alternative forms of practicum placement will be possible where students can count volunteer or employment experience in the summer or at other times as part of their practicum. 3 cr. Prerequisite: Fourth-year standing in Legal Studies.

LGLS 4099U Legal Studies Integrating Project. This course is designed to allow students to participate in an upper-level research seminar in legal studies. Emphasis will be placed on student participation in all aspects of the course. Student participation will include class presentations, class discussions, scheduled and routine meetings with the instructor and several written assignments that will contribute to the development of the research project. Students will be expected to demonstrate an advanced level of understanding based on their previous course working this program. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Legal Studies.

LGLS 4200U Law and Social Change. This capstone course addresses the interplay between law, law-making and social change. It asks students to use the theoretical and conceptual insights of prior courses to think critically about the possibilities and limits of law as a mechanism of social change. 3 cr, 3 lec. Prerequisite: Fourth-year standing in the Legal Studies major.

LGLS 4800U Independent Study. The course provides students with the opportunity to engage in an in-depth study of a specific topic within the discipline. This will involve individual reading and scholarship at an advanced level under faculty supervision. Students will conduct an extensive literature review and write a major essay/critique of the relevant literature. Instructor and dean's consent required. Limited seats available. 3 cr. Prerequisites: Fourth-year standing with a cumulative 3.7 GPA.

LGLS 4901U Honours Thesis I. A specific scholarly project on a well-defined topic, to be determined in consultation with thesis supervisor. Honours Thesis I involves a literature review and the preparation of a thesis proposal for the intended project. Regular student/supervisor meetings will be scheduled. Prerequisites: Fourth-year standing with a minimum 3.7 cumulative GPA, permission of the dean and the supervisor.

LGLS 4902U Honours Thesis II. A specific scholarly project on a well-defined topic, to be determined in consultation with the thesis supervisor. Honours Thesis II is a continuation of Honours Thesis I. This course will require students to complete the project initiated in Honours Thesis I which will involve conducting research and writing a publishable quality manuscript based on the findings of the research. Instructor and dean's consent required. Regular student/supervisor meetings will be scheduled. Prerequisites: SSCI 4901U Honours Thesis I with minimum A- and a minimum 3.7 cumulative GPA.

MATH 0100P Pre-University Mathematics. Following a quick overview of the Grade 9 and 10 content of the Ontario curriculum, this course will focus on the upper-level portion of that curriculum. Topics will include linear, polynomial, exponential, logarithmic, and trigonometric functions and equation solving, sequences and series, and an introduction to rates of change. The course prepares students for studying Calculus and other university and college courses that require secondary school mathematics. MATH 0100P is a non-credit course that takes students up to the level of Ontario Secondary School Functions and Relations course. This course is offered in an online format and features online self-learning materials and online office hours. Prerequisite: Grade 9 mathematics. Grade 10 mathematics is strongly recommended.

MATH 1000U Introductory Calculus. This course provides an introduction to calculus through the study of limits and continuity, the derivative, integration, the Fundamental Theorem of Calculus, and other topics as time permits. Applications to science will be incorporated throughout the course. 3 cr, 3 lec, 2 tut. Prerequisite: Grade 12 Advanced Functions (MHF4U). Credit restrictions: BUSI 1900U, MATH 1010.

MATH 1010U Calculus I. Applications to science and engineering using differential calculus. Emphasis on limits, continuity, the derivative, Mean Value Theorem for derivatives and integrals, approximation by differentials, Fermat's Theorem, differentiation and anti-differentiation, definite integrals, areas between curves, and the Fundamental Theorem of Calculus. 3 cr, 3 lec, 1.5 tut. Prerequisite: Grade 12 Advanced Functions (MHF4U) and Grade 12 Calculus and Vectors (MCV4U). Credit restrictions: BUSI 1900U, MATH 1000U, MATH 1880U.

MATH 1020U Calculus II. A continuation of Calculus I or Introductory Calculus emphasizing integral calculus: problem solving, calculations and applications. Applications to volumes, arc length, polar co-ordinates and functions of two or more variables. Multivariable calculus: partial derivatives, differential equations, Taylor and MacLauren series, double integrals. 3 cr, 3 lec, 1.5 tut. Prerequisite: MATH 1000U or MATH 1010U.

MATH 1850U Linear Algebra for Engineers. Develops the fundamental ideas of linear algebra and demonstrates their applications to other areas. Topics include the algebra of matrices; systems of linear equations; determinants and matrix inverses; real and complex vector spaces, linear independence, bases, dimension and co-ordinates; inner product spaces and the Gram-Schmidt process; least squares and regression; linear maps and 258 matrices, change of basis and similar matrices; eigenvalues, eigenvectors and matrix diagonalization; quadratic forms. 3 cr, 3 lec, 1.5 tut. Corequisite: MATH 1000U or MATH 1010U. Credit restriction: BUSI 1900U, MATH 2050U.

MATH 1880U Mathematical Modelling for Health Science. This course enables the student to gain an understanding of the use of mathematical modeling as a tool in the health sciences, and to be able to carry out such modelling at an elementary level. This will enable the student to better understand current and future developments in medical practice that re-based upon the use of mathematical models. Topics and their applications will include: functions and graphs, sequences and series, difference equations, differentiation and integration. 3 cr, 3 lec, 1.5 tut. Credit restrictions: MATH 1000U, MATH 1010U. Note: Not for credit in a science or engineering program.

MATH 2010U Calculus III. Examines the concepts, techniques and uses of differential and integral calculus of functions of more than one variable. Topics include: vectors and the geometry of two- and three-dimensional Euclidean space; multivariate functions (scalar fields, limits, continuity, partial derivatives, chain rule); directional derivatives and gradients; curves and surfaces in Euclidean space; vector fields; Taylor's theorem in several variables, linear and quadratic approximations; multivariate optimization; iterated integrals over rectangular domains in two and three dimensions. 3 cr, 3 lec, 1 tut. Prerequisite: MATH 1020U. Corequisite: MATH 1850U or MATH 2050U.

MATH 2020U Calculus IV. Examines the concepts, techniques and uses of vector calculus. Topics include: multivariate functions (scalar and vector fields); spherical and cylindrical polar co-ordinate transformations; general co-ordinate transformations; iterated integrals over nonrectangular domains; vector differential operators (gradient, divergence, curl); parametric curves and arc length; parametric surfaces and surface area; line integrals and surface integrals; Green's theorem, Gauss' theorem, Stokes' theorem; infinite series of real numbers and power series; uniform convergence of series of functions. 3 cr, 3 lec, 1 tut. Prerequisite: MATH 2010U. Credit restriction: MATH 2810U.

MATH 2050U Linear Algebra. This course is designed to develop the fundamental ideas of linear algebra, and to demonstrate some applications of linear algebra to other areas. Topics include the algebra of matrices; qualitative and quantitative solutions of systems of linear equations; determinants and matrix inverses; real and complex vector spaces, and subspaces, linear independence, bases, dimension and co-ordinates; inner product spaces and the Gram-Schmidt process; inconsistent (over determined) systems of equations, least squares solutions and regression; linear maps and matrices, change of basis and similar matrices; eigenvalues, eigenvectors and matrix diagonalization; diagonalization of real symmetric matrices and quadratic forms. 3 cr, 3 lec. Prerequisite or corequisite: MATH 1000U or MATH 1010U. Credit restrictions: BUSI 1900U, MATH 1850U.

MATH 2060U Differential Equations. A study of differential and difference equations that arise as models of phenomena in many branches of physical and biological sciences, in engineering, and in social science. Examples include Newtonian mechanics, chemical kinetics, and ecological system models. Students learn the basic properties of differential and difference equations, techniques for solving them, and a range of applications. 3 cr, 3 lec. Prerequisites: MATH 1020U, MATH 2050U. Credit restriction: MATH 2860U.

MATH 2070U Numerical Methods. This course provides an overview of, and practical experience in, using algorithms for solving numerical problems arising in engineering. Topics include: solution of nonlinear equations in one variable, interpolation and data-fitting, numerical differentiation and integration, solution of differential equations, and elements of numerical linear algebra. Students will use computer software such as Maple or Matlab in the solution of numerical problems. 3 cr, 3 lec, 1 tut. Prerequisites: MATH 1020U, MATH 1850U or MATH 2050U. Credit restriction: MATH 2072U.

MATH 2072U Computational Science I. This course provides an overview of and practical experience in using algorithms for solving numerical problems arising in applied sciences. Topics include: computer arithmetic, solution of nonlinear equations in a single variable, interpolation and data-fitting, numerical differentiation and integration, solution of differential equations, and elements of numerical linear algebra. Students will use computer software such as Maple or Matlab in the solution of numerical problems. 3 cr, 3 lec, 1 tut. Prerequisites: MATH 1020U, MATH 1850U or MATH 2050U. Credit restriction: MATH 2070U.

MATH 2080U Discrete Mathematics. This is an elementary introduction to discrete mathematics. Topics covered include first-order logic, set theory, fundamental techniques of mathematical proof, relations, functions, induction and recursion, combinatorics, discrete probability, finite-state machines, and graph theory. 3 cr, 3 lec, 1 tut. Prerequisite: MATH 1020U. Corequisite: MATH 1850U or MATH 2050U. Credit restrictions: CSCI 1010U, CSCI 2110U, ENGR 2110U. Cross-listed: CSCI 2110U.

MATH 2810U Advanced Engineering Mathematics. This course extends the study of calculus and differential equations, including multiple integration: integral theorems, polar co-ordinates and changes of variables; differential and integral calculus of vector valued functions of a vector variable: vector algebra, line and surface integrals, Green's, Gauss' and Stokes' theorems; and introduction to partial differential equations: Heat equation, Laplace's equation, wave equation. 3 cr, 3 lec, 1 tut. Prerequisite: MATH 1020U. Credit restriction: MATH 2020U.

MATH 2860U Differential Equations for Engineers. A study of differential equations that arise as models of phenomena in engineering. Topics include: first order equations; linear equations; second-order equations and their applications; systems of linear equations; series solutions; Laplace transforms; introduction to partial differential equations. 3 cr, 3 lec, 1 tut. Prerequisite: MATH 1020U. Corequisite: MATH 1850U or MATH 2050U. Credit restriction: MATH 2060U.

MATH 3020U Real Analysis. This course provides the foundation for real analysis, and prepares students for other branches of mathematics, mathematical statistics and quantum mechanics. Students study the construction of real and complex number systems; partial and total order relations; countable and uncountable sets; mathematical induction and other techniques of proof; numerical sequences and series; absolute and conditional convergence; basic topological notions in a metric space; continuous functions; continuity and compactness; continuity and connectedness; uniform continuity; sequences and series of functions; uniform convergence; the Riemann-Stieltjes integral; rectifiable curves; fixed points and the contraction principle; introduction to one-dimensional discrete dynamical systems. 3 cr, 3 lec. Prerequisites: MATH 2020U, MATH 2080U or CSCI 1010U or CSCI 2110U or ENGR 2110U.

MATH 3040U Optimization. This course introduces linear and nonlinear optimization problems and offers the concepts and techniques required for their solution. Students study: linear programming (simplex method, duality, integer programming), nonlinear programming (Lagrange multipliers, KKT optimality conditions), approximation techniques (line search methods, gradient methods, conjugate gradient methods), variational problems (Euler-Lagrange equation), dynamic programming, and optimal control. 3 cr, 3 lec, Prerequisites: MATH 2010U, MATH 1850U or MATH 2050U.

MATH 3050U Mathematical Modelling. This course provides an overview of the mathematical modelling of discrete, continuous and stochastic systems. Problems arising in physics, chemistry, biology, industry, economics, and social science serve as examples to demonstrate model development, implementation, solution and analysis. Methods of solution and physical interpretation of results are stressed. Computer software such as Maple and Matlab will be used to facilitate the modelling process. 3 cr, 3 lec. Prerequisites: MATH 2010U, MATH 2060U or MATH 2860U, STAT 2010U or STAT 2020U or STAT 2800U.

MATH 3060U Complex Analysis. Introduces some classical theorems and applications of complex analysis. Students study basic properties of complex numbers; the Cauchy-Riemann equations; analytic and harmonic functions; complex exponential and logarithmic functions; branches of multi-valued functions; contour integrals; the Cauchy-Goursat Theorem and the Cauchy Integral Formula; the maximum modulus principle; Taylor and Laurant series; the residue theorem. 3 cr, 3 lec. Prerequisite: MATH 2010U. Credit restriction: ENGR 2530U.

MATH 3070U Algebraic Structures. This introductory course in algebraic structures is designed for students in the mathematical sciences as well as physics and chemistry. Students study groups, symmetric groups, subgroups, equivalence relations; normal subgroups, factor groups, mappings and inverse mappings; the Fundamental Homomorphism Theorem; rings, sub rings, ideals, quotient rings, polynomial rings, the Euclidean algorithm, the Fundamental Ring Homomorphism Theorem, finite fields, applications of groups, rings, and fields. 3 cr, 3 lec. Prerequisites: MATH 1850U or MATH 2050U, MATH 2080U or CSCI 1010U or CSCI 2110U or ENGR 2110U.

MATH 4010U Dynamical Systems and Chaos. The modern theory of differential equations studies the behaviour of solutions of nonlinear differential equations. In particular, the notion of dynamical system is crucial to the development of the theory and leads to the analysis of chaotic solutions. The course will provide the student with a rigorous treatment of the qualitative theory of ordinary differential equations, and an introduction to the modern theory of dynamical systems and to elementary bifurcation theory. 3 cr, 3 lec. Prerequisites: MATH 2060U and at least two 3000- level MATH courses.

MATH 4020U Computational Science II (formerly Numerical Analysis). This course provides a variety of results and algorithms from a theoretical point of view. Students study numerical differentiation and integration; interpolation and approximation of functions; quadrature methods; numerical solution of ordinary differential equations; the algebraic eigenvalue problem. Computer software such as Maple and MatLab will be used in assignments. 3 cr, 3 lec. Prerequisites: MATH 1850U or MATH 2050U, MATH 2010U, MATH 2070U or MATH 2072U.

MATH 4030U Applied Functional Analysis. This course introduces the student to the modern theory of infinite-dimensional spaces and its applications. The main topics revolve around Banach and Hilbert spaces and their applications to Fourier series, differential and integral equations. The course will focus on developing intuition and building a catalogue of examples of infinite-dimensional spaces. Moreover, the course introduces the very important notions of Lebesgue measure and Lebesgue integrals. Applications will play a major role in motivating the theory. 3 cr, 3 lec. Prerequisites: MATH 3020U, MATH 3060U.

MATH 4041U Topics in Applied Mathematics I. This course covers various advanced topics that will enable the students to broaden their mathematical background and allow them to explore areas in which they have particular interest. Topics in Applied Mathematics I will be chosen according to the needs and demands of students and the availability of the instructors. 3 cr, 3 lec. Prerequisites: MATH 2072U or MATH 2070U, MATH 3050U, and at least one other 3000-level MATH course.

MATH 4042U Topics in Applied Mathematics II. This course covers various advanced topics that will enable the students to broaden their mathematical background and allow them to explore areas in which they have particular interest. Topics in Applied Mathematics II will be chosen according to the needs and demands of students and the availability of the instructors. 3 cr, 3 lec. Prerequisite: MATH 4041U.

MATH 4050U Partial Differential Equations. This course considers advanced aspects of the theory, solution and physical interpretation of first and second order partial differential equations in up to four independent variables. This includes the classification of types of equations, and the theory and examples of associated boundary-value problems. The concepts of maximum principles and Green's functions are studied, as well as an introduction to nonlinear equations. A broad range of applications are considered. 3 cr, 3 lec. Prerequisites: MATH 3020U, MATH 3050U, MATH 3060U.

MATH 4060U Industrial Mathematics. A case studies approach is taken to the mathematical modelling of industrial problems and other physical problems that are relevant for industrial applications. Potential topics include: lubrication theory and slow viscous flow phenomena, elasticity, plasticity, crack propagation, chemical reactors and chemical kinetics, heat transfer, materials science modelling, stability theory and vibrations of machinery, semiconductor device modelling, electromagnetic and inverse problems, optimal design. For each topic covered, the modelling process of a specific example is followed from problem formulation to solution. Discrete, continuous, deterministic and stochastic models are used, as is a variety of solution techniques, both analytical and numerical. Both theoretical and practical issues will be considered. 3 cr, 3 lec. Prerequisites: MATH 3050U, and at least one other 3000-level MATH course.

MATH 4410U Mathematics Thesis Project I. The thesis project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study and to satisfy specific objectives and requirements. The project will be selected to include research that has been approved by the supervising faculty member. Students will submit a progress report at the end the first semester. Once all work is completed, each student must submit a thesis and make a presentation based on their research in the following semester. 3 cr, 9 oth. Prerequisites: Students will have completed 90 credit hours in their area of specialization and be in clear standing, and must obtain prior consent of a faculty member. Note: Students are expected to take MATH 4420U in the following semester.

MATH 4420U Mathematics Thesis Project II. A continuation of the project started in MATH 4410U. Students will make presentations based on their research and submit a written thesis. 3 cr, 9 oth. Prerequisite: MATH 4410U. Note: Students are expected to take this course immediately after MATH 4410U.

MATH 4430U Directed Studies in Mathematics. This course requires independent research of a current topic in a specialized area of mathematics. The topic will be selected from recent research literature and involve a review and critical appraisal of underlying experimental principles. The course comprises independent library research, participation in weekly meetings, and written and oral presentations. 3 cr, 1 lec, 2 oth. Prerequisites: Students must have completed 90 credits in the Applied and Industrial Mathematics program and must be in clear standing. Students must also obtain prior consent of a faculty member.

MLSC 1010U Introduction to Medical Laboratory Practice. This course will introduce the student to the profession of Medical Laboratory Science; its history, inter-relationships to other health professionals, relevant professional associations and regulatory bodies. The scope and role of the Medical Laboratory Technologist within the core disciplines (biochemistry, hematology, blood transfusion, microbiology, and histology) and the advanced disciplines (immunology, cytology, cytogenetics, and molecular diagnostics) will be examined. The fundamental knowledge, skills and attitudes required of a student progressing on to MLS discipline specific courses will also be introduced. Safety, specimen collection, basic instrumentation, solution preparation, staining, microscopy and quality control provide a foundation for the role of the medical laboratory technologist. 3 cr, 3 lec, 2 lab. Prerequisites: CHEM 1020U, HLSC 1201U, HLSC 2110U.

MLSC 2111U Clinical Biochemistry I. Clinical Biochemistry I examines the theory, application and clinical significance of basic analytical procedures in the clinical chemistry laboratory. It encompasses basic clinical and analytical aspects of enzymes, proteins, lipids, carbohydrates and body fluids as well as common techniques and principles of photometry, electrochemistry, and osmometry. Manual, semi-automated, and automated analyses are used to enforce basic laboratory practices of calibration, sample handling, result reporting, and basic quality control. 3 cr, 3 lec, 3 lab. Prerequisites: MATH 1880U, MLSC 1010U. Corequisite: HLSC 2461U.

MLSC 2121U Clinical Hematology I. This course introduces fundamental knowledge and techniques used in the study of Hematology. Topics discussed include normal composition, production, metabolism, function and morphology of blood cells and hematopoietic organs. Current manual and automated laboratory procedures relating to blood cell structure, function and morphology are examined and applied and their significance in the diagnosis of blood disorders is emphasized. 3 cr, 3 lec, 3 lab. Prerequisites: MATH 1880U, MLSC 1010U. Corequisite: HLSC 2461U.

MLSC 2130U Foundations in Clinical Microbiology and Immunology. This course will introduce students to the microbial world, and will serve as a foundation for Clinical Microbiology courses or for entry into health care-related programs. Students will learn about the different types of microorganisms with an emphasis on bacteria, and will come to appreciate the importance of microorganisms in our daily lives. This course will introduce students to the clinical relevance of microorganisms with emphasis on basic principles of identification, culturing, controlling, and pathogenesis of bacteria. The course also includes basic principles of immunology with emphasis on immunological techniques which will serve as foundation for Clinical Microbiology, Clinical Biochemistry, Clinical Hematology and Transfusion Science courses. 3 cr, 3 lec. Prerequisite: HLSC 1201U. Credit restriction: BIOL 2060U.

MLSC 2131U Clinical Microbiology I. This course provides fundamental microbiology and immunology knowledge with emphasis on prokaryotic cell structure, function and genetics, modes of action of antimicrobial agents and transfer of antimicrobial resistance; the immune response; etiology, pathogenesis, epidemiology, treatment and control of important infectious disease in humans. Laboratory exercises develop fundamental skills in aseptic technique, microscopy, pure culture study, antimicrobial susceptibility testing, and the isolation and identification of pathogenic microorganisms. 3 cr, 3 lec, 6 lab. Prerequisites: MLSC 1010U, MLSC 2130U. Corequisite: HLSC 2461U.

MLSC 3111U Clinical Biochemistry II. Clinical Biochemistry II builds on Clinical Biochemistry I to encourage an enhanced appreciation of the clinical and analytical aspects of biochemical diagnostic procedures related to major physiological systems, organs, and processes including endocrinology, renal, cardiac, gastric, pancreatic, and liver functions. Clinical significance and methods of analysis of special biochemistry analytes such as hormones and metabolites, therapeutic drugs and toxicology, trace elements, and vitamins. It will provide advanced knowledge of techniques used in a clinical chemistry laboratory including chromatography, electrophoresis, immunochemistry, and molecular diagnostics. Automated and specialized laboratory procedures are performed along with method validation criteria and advanced quality control evaluation. 3 cr, 3 lec, 3 lab. Prerequisites: HLSC 2461U, MLSC 2111U.

MLSC 3121U Clinical Hematology II. Clinical Hematology II expands on hematology theory and practice with an emphasis on important blood disorders involving erythrocytes, leukocytes and platelets. Morphology, investigative procedures and laboratory findings related to blood disorders will be examined. 3 cr, 3 lec, 3 lab. Prerequisite: HLSC 2461U, MLSC 2121U. Corequisite: MLSC 3230U.

MLSC 3131U Clinical Microbiology II. Clinical Microbiology II addresses the theory and methodologies involved in the laboratory diagnosis of bacterial, yeast and yeast-like infections in humans. An emphasis is placed on diagnosis of infectious agents relevant for each body system/anatomical site. Included are discussions and/or practical activities related to specimen collection and processing, culture and sensitivity procedures, infection control, and the emerging global significance of infectious diseases. 3 cr, 3 lec, 7 lab. Prerequisites: HLSC 2461U, MLSC 2131U.

MLSC 3210U The Practice of Effective Leadership, Quality Management, and Professionalism in the Clinical Laboratory. This course focuses on specific knowledge and skills required for taking a leadership role in the practice of medical laboratory technology. The students are exposed to the laws and policies of the Canadian health care system and how the practice and principles of professionalism, leadership, and ethics apply to the profession of medical laboratory science. In addition, the students are exposed to the application of fundamental quality management tools; such as quality and resource management systems, quality assurance, change management, critical thinking and effective communication. 3 cr, 3 lec. Prerequisite: HLSC 2030U. Corequisite: HLSC 3710U.

MLSC 3220U Transfusion Science. This course focuses on the specific knowledge and skills needed for practice in a blood transfusion laboratory, including legal and regulatory requirements related to the Canadian Blood System. Students also learn the protocols for the collection, storage, preparation and testing of donor units. 3 cr, 3 lec, 3 lab. Prerequisites: MLSC 3121U, MLSC 3230U.

MLSC 3221U Transfusion Immunology and Hemostasis. The transfusion immunology component of this course introduces the theoretical concepts and immunological principles fundamental to testing in the transfusion laboratory. The material covered in this course will form the foundation for MLSC 3220U Transfusion Science in the following semester. In the hemostasis component, the principles of hemostasis theory, including related bleeding disorders will be studied. Common laboratory techniques used in the diagnosis of these disorders will be performed. Correlation with clinical findings will be discussed, along with introducing the role of the transfusion laboratory in the provision of blood products to treat bleeding disorders. 3 cr, 3 lec, 3 lab. Prerequisite: MLSC 2121U. Corequisite: MLSC 3121U.

MLSC 3230U Microanatomy and Histotechnology. The microanatomy component of this course emphasizes the morphological identification of the basic tissues and the normal arrangement of these tissues in the body systems, an essential prerequisite to the practice of histotechnology. This course also integrates the theoretical aspects of histopathology with the technical aspects of histotechnology so that students gain the knowledge and skills required for the preparation and examination of tissue samples for pathology screening and diagnosis. An introduction to molecular pathology will be included. 3 cr, 3 lec, 6 lab. Prerequisites: BIOL 2020U, HLSC 2461U, MLSC 1010U, MLSC 2130U.

MLSC 3300U Simulated Clinical Practicum. This practicum experience takes place at the university. Students will work on multiple simulated clinical specimens that are related to specific patient histories. Students will be expected to assess the laboratory results produced and correlate this information to the patient histories and further case study information in order to make recommendations for further testing, monitoring and/or intervention. The emphasis will be on clinical reasoning and clinical judgment skills. This course will also provide an opportunity for students to gain further experience on a variety of instrumentation. The intended outcome of this course is to enhance the readiness of students to enter the next phase of the clinical practicum. 3 cr. Prerequisites: HLSC 2461U, MLSC 3111U, MLSC 3121U, MLSC 3131U, MLSC 3230U.

MLSC 4300U Clinical Practicum I. Clinical Practicum I offers students the opportunity to work in a laboratory setting and to acquire experience in the main disciplines of laboratory practice: biochemistry, hematology, microbiology, histotechnology, and transfusion medicine. Students registered in MLSC 4300U must register in MLSC 4301U to receive a grade. 9 cr. Prerequisites: HLSC 2030U, MLSC 3210U, MLSC 3300U. Corequisite: MLSC 4400U.

MLSC 4301U Clinical Practicum II. Clinical Practicum II allows students to continue to learn and experience the main disciplines of laboratory practice in a laboratory workplace setting. 9 cr. Prerequisite: MLSC 4300U. Corequisite: MLSC 4401U.

MLSC 4400U Clinical Theory and Project I. This course integrates and tests knowledge as it applies to pre-analytical, analytical and post-analytical phases of diagnostic laboratory testing and clinical reasoning in the main disciplines of biochemistry, hematology, histotechnology, microbiology, and transfusion medicine. Students are also expected to complete a literature review related to a current issue in health care and to establish the topic and methodology to be used to complete a research project in MLSC 4401U. Students registered in MLSC 4400U must register in MLSC 4401U to receive a grade. 3 cr. Prerequisite: HLSC 3910U. Corequisite: MLSC 4300U.

MLSC 4401U Clinical Theory and Project II. This course continues the integration and testing of knowledge as it applies to the pre-analytical, analytical and post-analytical phases of testing and clinical reasoning in the main medical laboratory science disciplines. Students are also expected to complete the research project identified in MLSC 4400U. 3 cr. Prerequisite: MLSC 4400U. Corequisite: MLSC 4301U.

NUCL 1530U Radiation and Nuclear Technologies. This course provides an introduction and overview of the application of radiation and nuclear technologies in society with particular emphasis on energy production, the environment and medicine. The importance of safety in general and radiation safety in particular is also covered. A principal aim of the course is to provide students with a broad overview of the many practical applications of radiation and nuclear technologies and the role of scientists and engineers in the development of these technologies for the betterment of society and the protection of the environment. 3 cr, 3 lec.

NUCL 2220U Radiation Effects on Material Properties. Structure of crystalline solids, solidification and defects, alloys and phase diagrams, mechanical properties of metals and alloys; irradiation effects on material properties, including neutrons, charged particles and gamma radiation; activation products; selection of materials for nuclear applications; radiation induced damage in materials. 3 cr, 3 lec. Corequisite: ENGR 2500U. Credit restriction: ENGR 2220U.

NUCL 4360U Nuclear Plant Electric and Auxiliary Systems. Nuclear plant unit electrical distribution systems, plant emergency electric power systems; condenser cooling systems; water and air cooling systems; low-pressure, high-pressure and recirculating service water systems; demineralized water systems; heavy water management and upgrading; instrument and breathing air systems. Prerequisite: ENGR 2790U.

NUCL 4520U Nuclear Plant Safety. Worker and public safety requirements; codes and standards; sources of radioactive release; defence in depth; principle of control, cool, contain; accident prevention, mitigation and accommodation; separation and independence; redundancy; common mode events; inherent safety features; plant safety systems; safety culture, management of plant safety; design basis accident; accident analysis; examples of nuclear accidents. 3 cr, 3 lec, 2 tut (biweekly). Prerequisite: ENGR 4640U. Credit restriction: ENGR 4520U.

NUCL 4540U Nuclear Steam Supply Systems. Introduction to thermal and fast reactors and reactor cooling systems; natural and enriched fuels; pressure vessels and pressure tubes; reactor structures; moderator materials and systems; reactor coolant materials and systems; shutdown and safety systems, heat generation and removal in the fuel; modes of heat transfer from fuel to coolant; boiling heat transfer; cooling by natural circulation; measurement of thermal-hydraulic parameters; momentum, mass and energy transfer processes; requirements for main heat transport, shutdown cooling and emergency core cooling systems. 3 cr, 3 lec. Prerequisite: ENGR 2500U.

NUCL 4545U Nuclear Plant Steam Utilization Systems. Main design and operating features of nuclear power plant steam utilization systems using pressurized and boiling light water, pressurized heavy water and gas cooled reactors; steam utilization systems for small, medium and large reactors; unit control schemes; steam generator design and operating features, steam generator level and pressure control; turbine and generator operation; condenser and feedheating systems. 3 cr, 3 lec. Prerequisites: ENGR 3820U and NUCL 4540U.

NUCL 4550U Thesis Project I. The thesis project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study, to satisfy specific objectives and requirements. The project topic will be selected to include some aspects of the student's specialization. Students will be required to organize and conduct a project with a significant analytical component, including consideration of technical, economic, environmental and other societal impacts. Thesis Project I will typically be a group project, but with each student having clearly defined roles, objectives and outcomes. The requirements include a written paper and a group presentation of the project outcomes. 3 cr, 1 lec, 4 lab, 1 tut. Prerequisite: Permission of the instructor.

NUCL 4560U Thesis Project II. The thesis project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study, to satisfy specific objectives and requirements. The project topic will be selected to include some aspects of the student's specialization. Students will be required to organize and conduct a project with a significant analytical component, including consideration of technical, economic, environmental and other societal impacts. Thesis Project II will typically be an individual research or design project, although with the approval of the professor, a significant and clearly delineated individual contribution to a group project is acceptable. The requirements include a written paper and an individual presentation of the project outcomes. 3 cr, 6 lab. Prerequisite: NUCL 4550U.

NUCL 4620U Radioactive Waste Management. Nature of radioactive waste; origin of low, intermediate and high activity waste; characteristics, forms and quantity of radioactive waste; production of radioactive waste at each stage of the nuclear cycle: mining, fuel fabrication, reactor operation and maintenance, spent fuel, reactor structural components; medical and industrial waste; handling, transporting, storing and disposing technologies for each type of waste; on-site and off-site storage; spent fuel reprocessing and disposal methods; radioactive waste management plans and practices in various countries; public concerns and perception of radioactive waste management. 3 cr, 3 lec. Prerequisite: ENGR 2500U. Credit restriction: ENGR 4620U.

NURS 0420U Professional Nursing – Bridging. Students will explore aspects of health and healing in the context of social, cultural, and spiritual diversity, values, beliefs, lifestyle choices, environment, and biophysical dimensions. The role and standards of practice for the registered nurse will be related to nursing knowledge, caring concepts and evidence based practice. Students will use reflective strategies to explore the meaning of lived caring experiences with examples from their own nursing practice and life experience. They will examine ways of caring as human beings and within the role of the registered nurse. 3 cr, 3 lec. Corequisite: HLSC 1300U. Registration in this course is restricted to BScN students in the PN – BScN bridge program.

NURS 1002U Introduction to Nursing Praxis. This course gives the student the opportunity to apply the concept of the therapeutic nurse-client relationship as the core focus of nursing praxis. They will also explore application of Professional Standards (College of Nurses of Ontario) and therapeutic communication techniques with clients and healthcare professionals. 3 cr, 3 lec. Corequisite: NURS 1100U.

NURS 1003U Foundations for Nursing Practicum I. The practice lab is the setting used to assist the nursing student in the acquisition of the knowledge and proficiency necessary for the competent performance of selected psychomotor skills. Students will observe, practice, research, review and critique fundamental nursing skills. 4 lab. Corequisite: NURS 1002U.

NURS 1100U Introduction to Health and Healing. This course introduces concepts that are the basis for nursing knowledge. Students will explore aspects of health and healing in the context of social and cultural diversity values, beliefs, lifestyle choices, environment, growth and development. The focus will be on maintenance and promotion of personal, individual, and family health and healing. 3 cr, 3 lec. Corequisite: NURS 1002U.

NURS 1420U Development of Self as a Nurse I. In this course students come to understand the significance of caring as a philosophy underpinning nursing praxis. Through inquiry into experience and relevant nursing knowledge, the students will understand how the concept of caring is foundational between persons in relationship with each other and the environment. Through critical thinking and reflective practice, students identify values, beliefs and assumptions; practice many ways of knowing; and understand the meaning of lived experiences. As students relate to the experience of becoming a nurse, they will utilize relevant research, literature and nursing theories. 3 cr, 3 lec. Corequisite: HLSC 1300U.

NURS 1503U Foundations for Nursing Practicum II. Building on skills learned in Foundations for Nursing Practicum I the nursing student will continue in the acquisition of the knowledge and proficiency necessary for the competent performance of selected psychomotor skills. Students will observe, practise, research, review and critique fundamental nursing skills. 4 lab. Prerequisite: NURS 1003U. Corequisite: NURS 1700U.

NURS 1700U Health and Healing: Older Adult Nursing Theory and Practicum. This course will provide the student with the opportunity to explore the lived experience and health needs of the older adult within the health care system. Students will apply Watson's Theory of Human Caring to identify, assess, plan, and implement interventions to promote health and healing for individuals and families connected to this population. This course has a theoretical and practicum component. Students will care for older adults in a hospital practicum setting. This practicum experience provides an opportunity for students to develop their knowledge, skill and judgement and follow the CNO practice standards. Students will demonstrate nursing theory-guided and evidence-informed praxis relevant to this course. 6 cr, 3 lec, 14 oth. Prerequisites: NURS 1100U, NURS 1002U, NURS 1003U, NURS 1420U. Corequisite: NURS 1503U, NURS 2320U. Note: Students must pass both the theoretical (classroom) and practicum (clinical) components of the course to pass the course.

NURS 2320U Health Assessment. This course is designed to provide the student with the cognitive, affective and psychomotor skills required to conduct a complete physical examination and health assessment of the client across the life cycle. Included are health history, physical examination, health promotion, and clinical assessment. Conceptual themes include holistic health practices, health promotion, client participation, cultural and diversity factors and developmental tasks. 3 cr, 1.5 lec, 2 lab. Prerequisites: HLSC 1200U, NURS 1003U. Corequisite: HLSC 1201U.

NURS 2420U Knowing Through Inquiry. This course is a place of questioning and discovery, revealing a process of knowing nursing through inquiry. Developing reflective and critical thinking, students explore their experience and disciplinary literature to construct nursing praxis that is theory-guided and evidence-informed. 3 cr, 2 lec. Prerequisite: NURS 1420U or NURS 0420U. Credit restriction: NURS 4420U.

NURS 2700U Health and Healing: Child and Family Nursing Theory and Practicum. This course enables students to explore the theory and practice of family-centred care. The focus is care of individuals and families experiencing health challenges and life transitions specific to pregnancy, childbirth, neonates, children, and families. Topics such as wellness, growth and development, health-teaching and health-promotion, family systems theory, and evidence-based approaches to care will be explored. Students will demonstrate nursing theory-guided and evidence-informed praxis relevant to this course. 6 cr, 3 lec, 14 oth. Prerequisite: HLSC 1201U, NURS 1503U, NURS 1700U, NURS 2320U or HLSC 1201U, NURS 1150U, NURS 1503U, NURS 1505U, NURS 2320U. Corequisite: NURS 2810U. Note: Students must pass both the theoretical (classroom) and practicum (clinical) components of the course to pass the course.

NURS 2701U Health and Healing: Adult Health Challenges Nursing Theory and Practicum. The focus of this course is nursing science theory as it relates to care of adults experiencing health challenges such as acute or chronic illness. It facilitates students' nursing practice in situations of health challenges. Critical thinking and clinical decision-making based on evidence is facilitated in classroom and practice settings and is guided by a nursing theoretical perspective. Previously learned nursing therapeutics (skills and assessments) will be enacted in increasingly complex care situations. The lived experiences of the client experiencing acute or chronic health challenges will be explored. Students will demonstrate nursing theory-guided and evidence-informed praxis relevant to this course. 6 cr, 3 lec, 14 oth. Prerequisite: HLSC 1201U, NURS 1503U, NURS 1700U, NURS 2320U or HLSC 1201U, NURS 1150U, NURS 1503U, NURS 1505U, NURS 2320U. Corequisite: NURS 2810U. Note: Students must pass both the theoretical (classroom) and practicum (clinical) components of the course to pass the course.

NURS 2705U Health and Healing: Child and Family Nursing Theory and Practicum (RPN to BScN). This course provides the foundation to enable students to provide safe, evidence-based family-centred care to newborns, infants, children, and families experiencing health challenges. Learners will utilize critical thinking skills and demonstrate collaborative, interprofessional care in both classroom and practicum settings as they transition from Registered Practical Nurse to Registered Nurse level of responsibility. Students will demonstrate nursing theory-guided and evidence-informed praxis relevant to this course. 6 cr, 3 lec, 16 oth. Prerequisites: HLSC 2202U, NURS 2820U. Note: Students must pass both the theoretical (classroom) and practicum (clinical) components of the course to pass the course. This course is restricted to students in the RPN to BScN Program.

NURS 2810U Pharmacology for Nurses. This course introduces the student to the concepts of pharmacology and medication administration. The student will learn about common drug classifications, and the psychological and cultural aspects of drug therapy. As well, the student will learn about the legal aspects, nursing responsibilities and decision-making processes required for the safe and accurate administration of medication to a variety of client populations. 3 cr, 2 lec, 2 lab. Prerequisites: HLSC 1201U, NURS 1700U, NURS 2320U. Corequisite: HLSC 2460U.

NURS 2820U Comprehensive Pharmacotherapeutics. This course created for students in the RPN to BScN stream introduces the student to the concepts of pharmacology and advanced medication administration. The student will focus on understanding the mechanisms of action, and classifications of many common medications administered to clients with a variety of health challenges. As well, the student will develop advanced health assessment skills to facilitate the decision-making process required for the safe and accurate administration of medication to a variety of client populations. This learning will take place in a highly interactive laboratory environment. 3 cr, 1.5 lec, 4 lab, 1.5 online. Prerequisites: HLSC 0880U, NURS 0420U.

NURS 3400U Providing Supportive Care to Oncology Patients: Nursing Implications. The course focuses on the supportive care needs of the patient diagnosed with cancer. It will provide the student an understanding of cancer and its treatments modalities, management, patient and family teaching and survivorship issues. The student will work toward the integration of the supportive care framework and the practice standards of oncology nursing. 3 cr, 3 lec. Prerequisites: HLSC 2461U, NURS 2700U or NURS 2701U or NURS 2705U.

NURS 3700U Health and Healing: Healthy Communities Nursing Theory and Practicum. This course will present a comprehensive and critical analysis of community health nursing within a variety of settings and with a variety of patients (individual, family, group, community and society). This course will examine the process of community health nursing; including community assessments, planning, evaluation and strategies for promoting community health. The historical and philosophical basis of community health nursing praxis will be examined. Topics include primary health care, epidemiology, determinants of health, program planning and evaluation, social justice, and healthy public policy. Students will demonstrate nursing theory-guided and evidence-informed praxis relevant to this course. 6 cr, 3 lec, 16 oth. Prerequisites: NURS 2420U, NURS 2700U, NURS 2701U, NURS 2810U or NURS 2100U, NURS 2150U, NURS 2007U/NURS 2507U, NURS 2008U/NURS 2508U, NURS 2810U or NURS 2705U, NURS 2820U or NURS 2155U, NURS 2506U. Note: Students must pass both the theoretical (classroom) and practicum (clinical) components of the course to pass the course.

NURS 3701U Health and Healing: Mental Health Nursing Theory and Practicum. The focus of this course is on concepts and principles of mental health nursing. Common mental health challenges are discussed, with an emphasis on nursing strategies for assessing, promoting, maintaining, and restoring mental health. Students are also provided with opportunities to apply concepts of mental health nursing to the care of individuals experiencing acute and long term mental health challenges. Practice occurs in a variety of mental health settings including acute care, long term care and community facilities. Nursing assessment skills, such as mental status assessment, and nursing intervention strategies, such as therapeutic communication, are facilitated. Students will also gain a greater awareness of the self and the role of the therapeutic use of self in the provision of care. Students will demonstrate nursing theory-guided and evidence-informed praxis relevant to this course. 6 cr, 3 lec, 16 oth. Prerequisites: NURS 2420U, NURS 2700U, NURS 2701U, NURS 2810U or NURS 2100U, NURS 2150U, NURS 2007U/NURS 2507U, NURS 2008U/NURS 2508U, NURS 2810U. Note: Students must pass both the theoretical (classroom) and practicum (clinical) components of the course to pass the course.

NURS 4100U Nursing Leadership. This course focuses on the leadership and management roles of the nurse within the context of nurses' scope of practice, as defined by current legislation and professional standards and expectations. Emphasis is on nurses becoming effective members of health care as employees and future leaders and managers. Content will address leadership and management theories, organizational structure, planned change, conflict, organizational communication, problem solving, decision making, strategies for effective delegation, motivation, nursing care delivery approaches and total quality management. 3 cr, 3 lec. Prerequisites: HLSC 3601U, HLSC 3800U, NURS 3700U, NURS 3701U or HLSC 3601U, HLSC 3800U, NURS 3007U/NURS 3507U, NURS 3008U/NURS 3508U, NURS 3100U, NURS 3150U or HLSC 3601U, HLSC 3800U, NURS 2705U, NURS 3700U or HLSC 3601U, HLSC 3800U, NURS 2155U, NURS 2506U, NURS 3100U, NURS 3507U.

NURS 4505U Professional Practice VIII. This course provides the student with the opportunity to work and learn in a health care setting of the student's choice, based on individual learning needs, lifelong goals and program progression policy. This integrated practicum experience uses the preceptor model and may occur in a variety of settings. Using a preceptor model the student has the opportunity to develop leadership and independence in her/his nursing practice and to achieve competency level expected for nurses entering the profession. In this clinical placement students will be expected to complete a project that addresses the needs of the setting and disseminates that knowledge to peers. A series of virtual client based learning seminars will support the theoretical underpinnings of the clinical practicum. 9 cr. Prerequisites: BIOL 2830U, HLSC 1300U, HLSC 2820U, HLSC 3710U, HLSC 3910U, NURS 4700U, NURS 4100U, NURS 4420U or NURS 2420U, PSYC 2010U, SOCI 1000U.

NURS 4700U Health and Healing: Synthesis Professional Practice. This course provides students with the opportunity to apply problem solving, critical thinking, clinical reasoning, effective and productive inter- and intra-personal communication, resource identification, and technical competency so that students may explore the complexities and types of problems that may arise in praxis. This course will require students to attend laboratory preparation sessions in the first weeks of the semester. Students will complete 190 hours of nursing practice in an assigned practicum setting, collaborating with faculty advisors, colleagues, and clinical partners (preceptors) to provide holistic, patient centred nursing care. Throughout the semester, students will participate in weekly evidence-based in-class and online seminar discussions based on clinical case studies. 6 cr, 3 lec, oth. Prerequisites: HLSC 2461U, NURS 3700U, NURS 3701U or NURS 2705U, NURS 3700U or HLSC 2461U, NURS 3100U, NURS 3150U, NURS 3507U, NURS 3508U or NURS 2155U, NURS 2506U, NURS 3100U, NURS 3507U. Note: Students must pass both the theoretical (classroom) and practicum (clinical) components of the course to pass the course.

PHY 1010U Physics I. This calculus-based course is intended for students who have completed high school calculus. It gives an introduction to basic mechanics, Newton's laws of motion; kinematics and dynamics in one and two dimensions; work and energy; friction; momentum and collisions; angular momentum, torque and rotation of rigid bodies; gravitation; simple harmonic motion; mechanical and sound waves; static equilibrium; fluid mechanics; kinetic theory of gases and thermodynamics. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisites: Grade 12 Calculus and Vectors (MCV4U) (required); Grade 12 Physics (SPH4U) (recommended). Credit restrictions: PHY 1030U, PHY 1810U. Note: Students without the recommended physics prerequisite will be responsible for making up background material.

PHY 1020U Physics II. Introduction to electromagnetism and optics: electric charge and Coulomb's law; electric field, electric flux, Gauss' law; electrostatic potential, capacitance; Kirchoff's laws in DC circuits. Magnetic forces and magnetic field; Biot-Savart law; Ampere's law; magnetic flux, Faraday's law, inductance; AC circuits. Electromagnetic waves; wave propagation; waves in matter. Geometrical and wave optics; special relativity. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisites: PHY 1010U or (PHY 1030U and MATH 1000U). Credit restrictions: PHY 1040U, PHY 1810U.

PHY 1030U Introductory Physics. This calculus based course introduces basic concepts of physics for students who did not take high school calculus, in the areas of thermodynamics, mechanics, vibrations and waves, sound waves and acoustics; gravitation; and properties of solids, liquids and gases. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisite: Grade 12 Advanced Functions (MHF4U) (required); Grade 12 Physics (SPH4U) (recommended). Corequisite: MATH 1000U. Credit restrictions: PHY 1010U, PHY 1810U. Note: Students without the recommended physics prerequisite will be responsible for making up background material.

PHY 1040U Physics for Biosciences. This course introduces basic concepts of physics relevant to the biological sciences, in the areas of electricity and magnetism; electromagnetic waves; optics; nuclear physics and nuclear medicine. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisite: PHY 1010U or PHY 1030U. Credit restrictions: PHY 1020U, PHY 1810U.

PHY 1810U Physics for Health Sciences. This course provides some of the basic physics needed by health scientists. The topics covered are biomechanics, fluid mechanics, optics, and electricity. 3 cr, 3 lec, 1.5 tut. Credit restrictions: PHY 1010U, PHY 1020U, PHY 1030U, PHY 1040U.

PHY 2010U Electricity and Magnetism I. This course provides the student with an introduction to the fundamental principles of classical electrodynamics. The course introduces: vectors in Cartesian, polar and cylindrical co-ordinates; scalar and vector fields; electric field, electric potential; Gauss' law; line and surface integrals; gradient and divergence operators; Poisson's and Laplace's equations; dipoles, multipole expansions; capacitance; polarization, electric displacement and boundary conditions; DC circuit analysis; capacitors and RC transients; Lorentz force law; divergence and curl of the magnetic field in magnetostatics. 3 cr, 3 lec, 3 lab (biweekly), 1.5 tut (biweekly). Prerequisites: PHY 1020U, MATH 1020U.

PHY 2020U Electricity and Magnetism II. PHY 2020U is a second course in electromagnetism. It continues to build a foundation in electricity and magnetism with discussions of electromotive force, electric currents and the continuity equation, motional electromotive force, electromagnetic induction and Faraday's law, the induced electric field, and energy in magnetic fields. Electrodynamics before and after Maxwell is presented along with further discussions of conservation laws, and the continuity equation. The course introduces Poynting's theorem, waves in one dimension, sinusoidal waves, boundary conditions, reflection and transmission and electromagnetic waves in a vacuum, and guided waves. 3 cr, 3 lec, 3 lab (biweekly). Prerequisite: PHY 2010U.

PHY 2030U Mechanics I. Solving linear ODEs; one-dimensional motion; simple harmonic oscillator; two and three-dimensional motion, including concepts of vector calculus; Newton's law of gravitation applied to celestial mechanics; nonlinear dynamics and deterministic chaos; comparison of linear and nonlinear systems; Poincaré surfaces, Lyapunov Exponents, maps, flows, and bifurcations. 3 cr, 3 lec, 1.5 tut. Prerequisites: CSCI 1000U or ENGR 1200U, MATH 1020U, PHY 1010U or PHY 1030U.

PHY 2040U Mechanics II. Inertial and noninertial frames in Newtonian mechanics, rotating co-ordinate systems; rotation of rigid body, Euler equations, dynamics of systems of particles, Hamilton's principle, Euler Lagrange equation, Lagrangian for particles and systems; rigid body dynamics; static equilibrium. Special relativity theory. 3 cr, 3 lec. Prerequisite: PHY 2030U.

PHY 2050U Thermodynamics and Heat Transfer. Basic concepts of thermodynamics; the First and Second Laws; properties and behaviour of pure substances; Ideal gases and mixtures; the equation of state for a perfect gas; Maxwell's relations; heat transfer by conduction, convection and radiation. 3 cr, 3 lec, 3 lab, 1.5 tut (biweekly). Prerequisites: MATH 1020U, PHY 1020U. Credit restrictions: CHEM 2040U, CHEM 3140U, ENGR 2640U.

PHY 2060U Nuclear Physics and Relativity. After a brief introduction to Einstein's special theory of relativity, and in particular to the equivalence of mass and energy, the energy available from nuclear fission and fusion is examined in detail. Topics include radioactivity: alpha, beta and gamma decay, binding energy; nuclear fission: chain reactions, neutron density and flux; nuclear fusion: plasma reactors, temperature, density and time duration of plasmas. Different types of currently existing fission reactors, and the current state of research on fusion reactors, will be examined. 3 cr, 3 lec, 1 tut. Prerequisite: PHY 1020U, MATH 1020U. Credit restriction: ENGR 2500U.

PHY 2900U The Science of Astronomy. This introductory course on the Astronomy of the Solar System is specifically designed for students who have a science background from any discipline. In this course students will begin by gaining an understanding of the basics of astronomy, our place in the Universe, and the development of the discipline from ancient astronomy to modern technology. Students will then begin a detailed exploration of the solar system gaining an understanding of its constituents, origin, and evolution as a whole. 3 cr, 3 lec. Prerequisites: PHY 1020U or PHY 1040U. Credit restrictions: SCIE 1900U, SCIE 1920U.

PHY 3010U Statistical Mechanics I. The course introduces students to the statistical behaviour of physical systems with large numbers of particles and degrees of freedom. This course shows how macroscopic thermodynamics can be explained by a statistical treatment of microscopic interactions, both classical and quantum. The course will introduce the dynamical basis of temperature, entropy, chemical potential and other thermodynamic quantities. 3 cr, 3 lec. Prerequisites: PHY 2030U, PHY 2050U or CHEM 2040U.

PHY 3020U Quantum Mechanics I. This course explores the development of quantum theory and contrasts its underlying structure with classical physics. The probabilistic nature of quantum mechanics will be introduced to describe the wave particle duality and the uncertainty principle, followed by the concept of wave function and the Shrödinger equation. Quantum principles will be applied to angular momentum and important standard problems such as potential well and barrier, harmonic oscillator and hydrogen atom. 3 cr, 3 lec. Prerequisites: MATH 1020U, MATH 2060U (recommended), PHY 2010U.

PHY 3030U Electronics. This course provides students with a strong understanding of electronic applications, starting with analysis of DC, AC and transient electric circuits; operational amplifiers, feedback and op-amp circuits; digital electronics, logic circuits, Boolean Algebra, memories and counters. Semiconductor physics will be introduced, with applications to diodes, junction and field effect transistors, and FET and MOSFET amplifiers. 3 cr, 3 lec, 3 lab. Prerequisite: PHY 2010U.

PHY 3040U Mathematical Physics. Application of ordinary and partial differential equations to physical problems, including boundary and initial value problems associated with heat, wave and Laplace equations. This course will include Fourier analysis, and expansions in Bessel and Legendre functions. Problems will be solved with computers, using both algebraic and numerical methods. 3 cr, 3 lec. Prerequisite: MATH 2060U or MATH 2860U. Note: Students will benefit from taking MATH 3050U along with this course.

PHY 3050U Waves and Optics. Waves topics include: damped and forced oscillations; coupled oscillators and normal modes; traveling and standing waves; boundary conditions and energy transfer; dispersion. Optics topics include: geometrical optics: reflection, refraction and transmission of electromagnetic waves; interference; diffraction; applications of optics including optical imaging and processing, interferometers, lasers, fibre optics, and nonlinear optical devices. 3 cr, 3 lec, 3 lab. Prerequisite: PHY 2030U.

PHY 3060U Fluid Mechanics. Static properties of fluids; kinematics of fluids, conservation of mass and the continuity equation; dynamics of fluids, Euler's equation, Bernoulli's equation; the energy equation. Viscous fluids, laminar and turbulent flows, flow in pipes and fittings, the Moody diagram. Flows around immersed bodies; lift and drag. Boundary layers, flow separation, flow measurement techniques. 3 cr, 3 lec, 3 lab (biweekly). Prerequisites: MATH 1020U, PHY 1010U or PHY 1030U; MATH 2060U or MATH 2860U is strongly recommended as a prerequisite. Credit restriction: ENGR 2860U.

PHY 4010U Statistical Mechanics II. Macro and microstates, statistical weight, Boltzmann and Gibbs distributions, partition and grand partition functions; microcanonical, canonical and grand canonical ensembles; statistical mechanics of isolated and interacting systems. Bose-Einstein and Fermi-Dirac statistics. Quantum statistics of ideal gases; blackbody radiation; paramagnetism in solids. 3 cr, 3 lec. Prerequisite: PHY 3010U.

PHY 4020U Quantum Mechanics II. Expands upon the concepts covered in the introductory course, with particular emphasis on applications to real systems. This course examines approximation methods including time independent and dependent perturbation theory, variational methods, the WKB approximation and scattering theory. Mathematical computer programs will be used to solve problems. 3 cr, 3 lec. Prerequisite: PHY 3020U.

PHY 4030U Modern Physics. This course introduces students to several important developments that have occurred in physics beyond the classical era. It deals with quantum properties of matter and covers three main topics: atomic and molecular physics; solid state physics; and quantum optics and lasers. A quantum mechanical description is used to interpret the properties of multi-electron atoms, the concepts of atomic orbitals and the Zeeman, Stark and Auger effects. The course addresses the fundamental properties of the solid state, including crystal structure and its role in formation of the electron bands, and associated dynamical, structural, electrical and optical phenomena as well as their interplay (e.g. thermoelectric and piezoelectric effects). Finally, the field of quantum optics, lasers and their interaction with various materials is explored, including very recent advances in laser cooling, photonic bandgap systems and quantum computing. 3 cr, 3 lec, 3 lab (biweekly), 1 oth. Prerequisites: PHY 3010U, PHY 3020U, PHY 3040U.

PHY 4040U Solar Energy and Photovoltaics. This course describes the basic science and the practical devices for conversion of solar energy into electrical energy using the photovoltaic effect. Topics include an introduction to renewable energy and the benefits of photovoltaics; absorption of solar energy: the solar spectrum, air mass; band structure and optical properties of materials and principles of devices that are relevant to photovoltaics; thermodynamics of light conversion; solar cell technology; photovoltaic systems and system economics. 3 cr, 3 lec, 3 lab (biweekly). Prerequisites: PHY 3010U, PHY 3020U, PHY 3030U.

PHY 4050U Emerging Energy Systems. The course will examine recent advances in energy systems including fossil, nuclear, solar, wind, biomass, municipal waste, geothermal, tidal, and wave energies; new energy sources, methods of conversion, transportation, storage, and disposal will be examined from a systems point of view and will include environmental, economic, and political aspects; feasibility of new technologies and significant advances in existing technologies will be examined. 3 cr, 3 lec. Prerequisite: ENGR 3260U or ENVS 3020U. Credit restriction: ENGR 4480U.

PHY 4080U Hydrogen-Based Energy Systems and Fuel Cells. This course explores hydrogen as an energy carrier and its conversion in hydrogen fuel cells. The focus is on polymer electrolyte fuel cells but the course includes a brief discussion of phosphoric acid, alkaline, and solid oxide fuel cells as well as other types of fuel sources, such as methanol or natural gas. The thermodynamic aspects of a hydrogen economy are discussed, encompassing production (reforming, electrolysis), storage (compression, solid matrix), transportation and usage in fuel cells. With regards to fuel cells, the main focus will be on general operating principles, electrochemistry, thermodynamics (efficiency, losses), and mass and heat transport phenomena, including two-phase flow. A general picture of i) current scientific challenges and ii) device modelling of fuel cells will emerge. 3 cr, 3 lec. Prerequisites: CHEM 1020U, PHY 2050U.

PHY 4100U Medical Imaging. The physical principles of the three main imaging modalities in current clinical practice, Magnetic Resonance Imaging (MRI), X-Ray Computed Tomography (CT), and Ultrasound (US) will be introduced from a medical physics perspective. Quantum mechanics and nuclear spin states for imaging will be compared and contrasted with image production via sound waves and X-rays. It will be shown how the different physical phenomena can be manipulated to generate clinically relevant images. The three modules of the course will entail a laboratory component, and extensive use of computer simulation and image analysis will be used. In addition, the current frontiers of medical imaging will be introduced. 3 cr, 3 lec, 2 lab. Prerequisites: MATH 2050U, PHY 3050U. Recommended: ENGR 2500U or PHY 2060U. Credit restriction: RADI 3200U.

PHY 4120U Forensic Physics Applications. This course introduces the student to forensic applications of physics, via the study of selected topics including ballistics, bloodstain analysis and motor vehicle collision reconstruction. Students will study the physics behind methods used to model crime events and will analyze evidence associated with these events using analytical instrumentation. 3 cr, 3 lec, 4 lab (biweekly). Prerequisites: FSCI 3010U, PHY 2030U, PHY 2050U, PHY 3060U.

PHY 4410U Physics Thesis Project I. The thesis project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study and to satisfy specific objectives and requirements. The project will be selected to include research that has been approved by the supervising faculty member. Students will submit a progress report at the end the first semester. Once all work is completed, each student must submit a thesis and make a presentation based on their research in the following semester. 3 cr, 9 oth. Prerequisites: Students will have completed 90 credit hours in their area of specialization and be in clear standing, and must obtain prior consent of a faculty member. Note: Students are expected to take PHY 4420U in the following semester.

PHY 4420U Physics Thesis Project II. A continuation of the project started in PHY 4410U. Students will make presentations based on their research and submit a written thesis. 3 cr, 9 oth. Prerequisite: PHY 4410U. Note: Students are expected to take this course immediately after PHY 4410U.

PHY 4430U Directed Studies in Physics. This course requires independent research of a current topic in a specialized area of physics, including, but not restricted to, biophysics, computational, solid state, and modern applied physics. The topic will be selected from the recent research literature and involve a review and critical appraisal of underlying experimental principles. The course comprises independent library research, participation in weekly meetings, and written and oral presentations. 3 cr, 1 lec, 2 oth. Prerequisites: Students must have completed 90 credits in their Physics program and must be in clear standing. Students must also obtain prior consent of a faculty member.

PHY 4610U Biophysics of Excitable Cells. Provides a basic understanding of the physical phenomena underlying nerve and membrane activity and illustrates how these influence the structure and function of excitable cells. It will be demonstrated how neural processes are utilized in sensory processes, such as the eye and ear. 3 cr, 3 lec. Prerequisites: BIOL 1020U, PHY 1020U.

POSC 1000U Political Science. This course introduces students to the central concepts of political science. The course deals with the scope, concerns, orienting concepts, leading approaches and methodologies of political inquiry, the major political ideologies, formal and informal institutions in the political process, problems of political and social change and Canadian and international politics. The emphasis is on how individuals participate in politics and on how politics may be changed through mobilization, social movements and globalization. This course cultivates an understanding of municipal, provincial, national and international levels of politics. 3 cr, 3 lec.

POSC 2000U Canadian Politics. This course will outline the basic theoretical and empirical background to understanding the institutions of Canadian politics. It will focus on the formal political, juridical, and institutional structures – the constitution, the Charter of Rights, federalism, the party system, Parliament – which comprise the Canadian state and political system, as well as social and economic development; migration; human rights and NAFTA. The focus will also be an assessment of the substantive aspects of democracy, the actual access to political power and the levels of equality that exist between citizens. 3 cr, 3 lec. Prerequisite: POSC 1000U.

POSC 4000U International Politics and Policy. This course adopts a comparative perspective and examines the political systems and behaviours across the contemporary world. A highly diverse set of themes and topics will be covered, such as the nature and function of the state, institutions of authoritarianism, processes of economic development and policy development, problems and challenges faced both by highly advanced industrialized countries and developing countries, the legacy of colonialism, political parties, values/ideologies, and finally, the intensifying impact of globalization on politics and policies of the contemporary world. This will all show the international policy making process and allow for comparisons with the Canadian policy process. 3 cr, 3 lec. Prerequisites: POSC 2000U, PUBP 2200U.

PSYC 1000U Introductory Psychology. This course introduces students to the study of human thought and behaviour. Through a survey of major theories, principles, and research findings across a variety of fields within psychology, students will gain a better understanding of why people think and behave as they do. Typical topics include: the history of psychology, research methods, sensation and perception, learning, memory, emotion and motivation, consciousness, stress and health, social influences, developmental factors, psychological disorders and treatment. 3 cr, 3 lec.

PSYC 2010U Developmental Psychology. This course is a comprehensive study of human development across the life-span from a developmental psychology perspective. The course examines developmental processes and milestones of the individual from conception through late adulthood, with particular emphasis on behavioural and cognitive development. Students will be introduced to the major psychological theories, theorists, and controversies in the field of human development. 3 cr, 3 lec. Prerequisite: PSYC 1000U.

PSYC 2020U Social Psychology. This course will introduce the scientific study of social behaviour and the social influences on human behaviour. Theories and research on such topics as attitude change and persuasion, stereotypes and prejudice, conformity and obedience to authority, altruism, attraction and close relationships may be introduced. Emphasis will be placed on experimental research, conducted both in the laboratory and in the field. 3 cr, 3 lec. Prerequisite: PSYC 1000U.

PSYC 2030U Abnormal Psychology. This course offers an introduction to understanding, assessing, and treating mental illness from a psychological perspective. Course material will focus on various categories of “abnormal” behaviour, including personality, anxiety, and mood disorders; schizophrenia; and substance related disorders. Implications for mental health and the law may also be considered. 3 cr, 3 lec. Prerequisite: PSYC 1000U.

PSYC 2040U Personality Psychology. This course will introduce different theoretical perspectives to the psychological study of personality. Approaches to human personality may include psychoanalytical, cognitive, humanistic, dispositional, behavioural, and biological. Methodological issues will also be discussed. Similarities and differences between the theories will be noted, as will empirical studies that have either supported or failed to support these ideas. 3 cr, 3 lec. Prerequisite: PSYC 1000U.

PSYC 2050U Brain and Behaviour. This course will examine aspects of human neuroscience particularly as they relate to how the brain’s normal and abnormal functioning affect human experience and behaviour. Particular emphasis will be placed on aspects of neuroanatomy and physiology that directly influence human language, thought, and learning. 3 cr, 3 lec. Prerequisite: PSYC 1000U.

PSYC 2060U Cognitive Psychology. This course provides an in-depth exploration of human cognition, focusing on both classic and current issues. The study of cognition relies heavily on experimental research designed to test models and theories of cognitive processes. Topics will include attention, perception, memory, knowledge, language, reasoning, decision-making, and other cognitive psychological topics. 3 cr, 3 lec. Prerequisite: PSYC 1000U.

PSYC 2100U Directed Laboratory Research. This course allows interested and eligible students to engage in individual scholarship and research at an advanced level under faculty supervision. Responsibilities may include, but are not limited to: literature searches, assisting with the collection or creation of stimuli, testing research tools and materials, writing ethics proposals, data collection, data entry, and data analysis. Interested students must obtain permission from a faculty supervisor and complete the application form prior to registering. 3 cr, 3 lec. Prerequisites: PSYC 1000U; second year standing or greater; cumulative GPA of 3.5 or greater.

PSYC 2830U Justice Theory and Policy. This course focuses on theoretical and empirical work on justice, and its implications for policy development in the justice system. Topics covered may include: procedural justice, distributive justice, interactional justice, retributive justice, and restorative justice. These topics are studied with regard to their role in examining and addressing social justice concerns through the effective development and implementation of policy. Prerequisite: PSYC 1000U. 3 cr, 3 lec. Credit restriction: SSCI 2830U.

PSYC 3040U Restorative Justice. This course examines the roots, principles, core assumptions and current practices of restorative justice in Canada and globally. Students are exposed to how restorative justice is a profoundly different approach to resolving crime and conflict. The course examines the needs and roles of key stakeholders (victims, offenders, communities, justice systems), and outlines some of the primary models of practice. It also identifies current challenges, dangers, and pitfalls of restorative justice. Future strategies of restorative justice will also be examined. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI2910U or SSCI 2920U) and (two of SSCI 2810U or SSCI 2820U or SSCI 2830U). Credit restriction: SSCI 3040U.

PSYC 3050U Clinical Forensic Psychology. Psychologists who work in legal settings are often confronted with unique questions and diagnostic dilemmas that are unique to forensic settings. This course reviews the myriad of issues surrounding the practice of clinical forensic psychologists in forensic settings with a primary emphasis on forensic assessment in criminal (e.g., competencies, insanity, risk assessment) and civil (e.g., personal injury, child custody, medical decision-making) contexts. 3 cr, 3 lec. Prerequisites: PSYC 2030U, LGLS 3210U.

PSYC 3055U Treatment in Forensic Settings. Psychologists provide psychological treatment in forensic settings. They work with populations such as youth and adults with substance abuse and dependence histories, youth and adult offenders, sex offenders, death-row inmates, children of divorcing parents, and victims of a wide variety of crimes, including intimate partner violence, child abuse and neglect, sexual abuse, and survivors of heinous crimes. This course provides students with knowledge of the wide variety of psychological services in these contexts, including the mechanics of treatment, treatment outcomes, and research on forensic psychological treatment. 3 cr, 3 lec. Prerequisites: PSYC 2030U, LGLS 3210U.

PSYC 3310U Confessions and Interrogations. This course will critically examine confessions and interrogations from a scientific, psychological perspective. Topics may include: interviewing techniques, false confessions, detecting deception in adults and children, the use of technology, and implications of research findings for justice system practices and policies. 3 cr, 3 lec. Prerequisites: PSYC 1000U and SSCI 2900U, LGLS 3210U or FSCI 4010U recommended.

PSYC 3320U Eyewitness Psychology. This course will review eyewitness memory from a psychological science perspective. The topics to be reviewed may include: reliability of eyewitness recall and identification accuracy, the role of eyewitness memory in conviction of the innocent, factors influencing the accuracy of eyewitness memory, methods of improving eyewitness memory, lay and practitioner evaluations of eyewitness memory, and the implications of eyewitness research for justice system practices and policies. 3 cr, 3 lec. Prerequisite: PSYC 1000U and SSCI 2900U, LGLS 3210U or FSCI 4010U recommended.

PSYC 3400U Investigative Psychology. This course will review various aspects of investigative psychology, including psychological and geographic profiling. Topics will include history of profiling research and practice, contemporary investigative psychological research and practice, and evaluation of profiling and investigative psychology research methods. 3 cr, 3 lec. Prerequisites: PSYC 1000U and SSCI 2900U, LGLS 3210U or FSCI 4010U recommended.

PSYC 3500U Stereotypes and Prejudice. This course will review and analyze theory and empirical research on stereotyping and prejudice. A number of themes will be explored, including the development of stereotypes and prejudice; intentional and unintentional consequences of stereotypes and prejudice; and possible ways to change stereotypes or reduce prejudice. 3 cr, 3 lec. Prerequisites: PSYC 1000U and SSCI 2900U, PSYC 2020U recommended.

PSYC 3820U Psychology of Deviance (formerly SSCI 2820U). This course provides a critical examination of the major biological, clinical, developmental, personality and social/environmental explanations of criminal and antisocial behaviour. Topics covered may include: genetics, hormonal and biochemical imbalances, mental disorders, learning, situational influences, and moral development. 3 cr, 3 lec. Prerequisite: PSYC 1000U. SSCI 2900U recommended.

PSYC 4098U Forensic Psychology Practicum. The practicum is an experiential learning tool that provides students with opportunities to acquire workplace skills and knowledge, confront the relationship between theory and practice, and cultivate a sense of personal and professional development. The course consists of 100 hours of fieldwork, several in-class seminars, and a set of academic assignments. Students are matched with host organizations based on the goals, interests, and learning outcomes identified in pre-placement interviews (verbal and written). In consultation with a designated fieldwork supervisor, students design, manage, and receive feedback on a series of self-directed workplace goals and objectives. 3 cr. Prerequisite: Fourth-year standing in the Forensic Psychology program.

PSYC 4101U Forensic Psychology Honours Thesis I. A specific scholarly project on a well-defined forensic psychological topic, to be determined in consultation with thesis supervisor. Honours Thesis I includes attending a weekly class, where forensic psychology thesis students will review aspects of the research process and submit written and oral accounts of their research project and its progress. In particular, students will prepare a literature review, the preparation of a thesis proposal for the planned project, and an oral presentation of the proposed project. Regular student/supervisor meetings will also be scheduled. Instructor and dean's consent required. 3 cr, 3 lec. Prerequisite: Fourth-year standing and a minimum 3.7 GPA in the Forensic Psychology program.

PSYC 4102U Forensic Psychology Honours Thesis II. A specific scholarly project on a well-defined forensic psychological topic, to be determined in consultation with thesis supervisor. Honours Thesis II involves conducting the project planned in Honour's Thesis I and attending the weekly class, where forensic psychology thesis students will review aspects of the research process and submit written and oral accounts of their research project and its progress. Honours Thesis II culminates with a written report and oral presentation of the project. Regular student/supervisor meetings will also be scheduled. Instructor and dean's consent required. NOTE: Students are expected to take this course in the term immediately following PSYC 4101U. 3 cr, 3 lec. Prerequisite: PSYC 4101U with a minimum A-, and a minimum 3.7 cumulative GPA.

PUBP 2200U Theories of Policy Analysis. 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 influences on public policy, varying conceptions of institutions, ideas and interest, and the role of these conceptions in explanations of policy change and stasis. 3 cr, 3 lec. Prerequisite: SSCI 1200U.

PUBP 2800U Economics for Public Policy I. This is an introductory course in economics for public policy. This course will include an introduction to microeconomic reasoning, concepts and analytical tools as well as an introduction to labour economics. 3 cr, 3 lec. Prerequisite: SSCI 1200U.

PUBP 3500U Equity Policy. This course is an introduction to social equity policy and administration in the private and public sector. Increasingly private and public organizations are establishing equity priorities. Some of the areas that will be covered include: social justice, equity policy development in the private sector, equity legislation, equity activism, gender equity, race and cultural equity, and equity administration. 3 cr, 3 lec. Prerequisite: PUBP 2200U.

PUBP 3501U Poverty and Public Policy. This course is an introduction to Canadian social policies with respect to poverty and income support. Some of the areas that may be covered include: the development of the welfare state, federal and provincial income support policies, the feminization of poverty, aboriginal poverty, childhood poverty, poverty activism, and workfare programs. 3 cr, 3 lec. Prerequisite: PUBP 2200U.

PUBP 3502U Community Development Policy. This course is an introduction to community development policies and practices. Community has many faces in modern times. Community can refer to traditional patterns of settlement or to sub-groups with social cohesion within a geographic area or even to linked interacting groups of people who communicate remotely but do not live in the same area. This course is an introduction to the development of community. Some of the topics that may be covered include: community definitions, community boundaries, ethnic and cultural communities, neighbourhoods, community building, and community activism. 3 cr, 3 lec. Prerequisite: PUBP 2200U or CDEV 1000U.

PUBP 3600U Education Policy. This course is an introduction to educational policies in Canada. Formal education is one of the most expensive and contentious areas of social policy. Some of the areas that may be covered include: the development of public education, post-secondary education, educational accessibility, education and social mobility, education and the workforce, lifelong learning, private education and training, public understanding of education issues, and public support for educational policies. 3 cr, 3 lec. Prerequisite: PUBP 2200U.

PUBP 3601U Health and Public Policy. This course is an introduction to health related policies in the private and public sectors. Some of the areas that may be covered include: workplace health and safety, public health agencies, public and private health care, alternative medicines, public understanding of health issues, and public support for different approaches to health care. 3 cr, 3 lec. Prerequisite: PUBP 2200U.

PUBP 3602U Workplace and Employment Policy. This course is an introduction to workplace and employment policies in the private and public sectors. Some of the areas that may be covered include: workplace health and safety, compensation regimes, unionization, professional associations, retirement, workplace training, institutional cultures, equity and recruitment. 3 cr, 3 lec. Prerequisite: PUBP 2200U.

PUBP 3603U Housing Policy. This course is an introduction in Canadian housing policy. Some of the areas that may be covered include: the development of public housing, rent controls, public housing policies, home ownership, and cooperative housing. 3 cr, 3 lec. Prerequisite: PUBP 2200U.

PUBP 3700U Social Theory and Technology. This course examines the social theoretical issues that have developed in the social studies of science and technology. Some of the areas that may be covered include: paradigm theory, technoscience, evolutionary theories, technical communities, social systems theory, network theory, discourse analysis, the science wars, and postmodernism. 3 cr, 3 lec. Prerequisite: PUBP 2200U.

PUBP 3750U Technology and Popular Culture. This course will survey the portrayal and role of technology in literature, film, television, and other media formats (including internet, radio, etc.), and how these might shape the ways in which we think about science and technology as objects of policy making. The course readings will include examples from these sources, along with scholarly literature that confronts these issues from sociological, philosophic, political, and other perspectives. Students will be required to think critically about the connection between technology, popular culture, and policy not only in the aforementioned media formats, but also in other macro cultural and interpersonal structures including economic systems, religion, family, peer-relationships, etc. 3 cr, 3 lec. Prerequisites: SSCI 1200U, SSCI 1470U.

PUBP 3751U Technology and Conflict. This course will provide a broad overview of the role of technology in political, environmental, socio-cultural, and other forms of conflict. More specifically, students will be required to critically examine topics including historical impacts of technology on criminal enterprise and interpersonal violence, genocide and ethnocide, deviance, and a broad range of political conflicts including espionage, arms races, and aerospace competition. Students will be required to address the practical and theoretical implications of current and future technologies with respect to (along with other topics determined by the expertise and interests of the instructor), peacemaking, reintegration of offenders into a technologically embedded culture, and the use and potential misuses of technology as surveillance. 3 cr, 3 lec. Prerequisites: SSCI 1200U, SSCI 1470U.

PUBP 3800U Economics for Public Policy II. This second course in economics for social policy continues the analysis of microeconomics and labour economics. It then introduces selected public finance topics such as tax incidence, public goods and externalities, and benefit-cost techniques. All of these topics will be considered for their relevance to social policy questions. 3 cr, 3 lec. Prerequisite: PUBP 2800U.

PUBP 4005U Independent Study. The course provides students with the opportunity to engage in in-depth study of a specific topic within the discipline. This will involve individual reading and scholarship at an advanced level under faculty supervision. Students will conduct an extensive literature review and write a major essay/critique of the relevant literature. Instructor and dean's consent required. Limited seats available. 3 cr. Prerequisite: Fourth-year standing with a cumulative 3.7 (A-) or greater GPA.

PUBP 4098U Public Policy Field Work Practicum. The practicum is an experiential learning tool that provides students with opportunities to acquire workplace skills and knowledge, confront the relationship between theory and practice, and cultivate a sense of personal and professional development. The course consists of 100 hours of fieldwork, several in-class seminars, and a set of academic assignments. Students are matched with host organizations based on the goals, interests, and learning outcomes identified in pre-placement interviews (verbal and written). In consultation with a designated fieldwork supervisor, students design, manage, and receive feedback on a series of self-directed workplace goals and objectives. 3 cr. Prerequisite: Fourth-year standing in Public Policy.

PUBP 4099U Public Policy Integrating Project. This course is designed to allow students to develop a project in public policy, which pulls together the key themes of the program, namely, theory, research and policy. Emphasis will be placed on independent scholarly inquiry reflective of a qualitative, quantitative, theoretical, or policy approach. Throughout this process, students will be expected to demonstrate an advanced level of understanding based on their previous course work in this program. The integrating project provides students with the opportunity, under the guidance of a faculty member, to synthesize and apply knowledge gained throughout their program of study. The students will select topics and approaches based on their areas of interest. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Public Policy.

PUBP 4101U Honours Thesis I. A specific scholarly project on a well-defined topic, to be determined in consultation with the thesis supervisor. Honours Thesis I involves a literature review and the preparation of a thesis proposal for the intending project. Instructor and dean's consent required. Regular student/supervisor meetings will be scheduled. 3 cr. Prerequisite: Fourth-year standing with a minimum 3.7 cumulative GPA.

PUBP 4102U Honours Thesis II. A specific scholarly project on a well-defined topic, to be determined in consultation with thesis supervisor. Honours Thesis II is a continuation of Honours Thesis I. This course will require students to complete the project initiated in Honours Thesis I which will involve conducting research and writing a manuscript of publishable quality based on the findings of the research. Instructor and dean's consent required. Regular student/supervisor meetings will be scheduled. 3 cr. Prerequisites: SSCI 4101U Honours Thesis I with minimum A- and a minimum 3.7 cumulative GPA.

PUBP 4500U Advanced Equity Policy. This is an advanced course in equity policies and practices. Students will consider a subset of equity issues in depth and at a high analytical level. 3 cr, 3 lec. Prerequisite: PUBP 3500U.

PUBP 4501U Advanced Poverty and Public Policy. This is an advanced course in Canadian social policies with respect to poverty and income support. Students will consider a subset of poverty policy issues in depth and at a high analytical level. 3 cr, 3 lec. Prerequisite: PUBP 3501U.

PUBP 4502U Advanced Community Development Policy. This is an advanced course in community development policies and practices. Students will consider a subset of community development issues in depth and at a high analytical level. 3 cr, 3 lec. Prerequisite: PUBP 3502U.

PUBP 4600U Advanced Education Policy. This course is an advanced course in educational policies and practices. Students will consider a subset of education policy issues in depth and at a high analytical level. 3 cr, 3 lec. Prerequisite: PUBP 3600U.

PUBP 4601U Advanced Health and Public Policy. This is an advanced course in health related policies in the private and public sectors. Students will consider a subset of health policy issues in depth and at a high analytical level. 3 cr, 3 lec. Prerequisite: PUBP 3601U.

PUBP 4602U Advanced Workplace and Employment Policy. This course is an introduction to workplace and employment policies in the private and public sectors. Some of the areas that may be covered include: workplace health and safety, compensation regimes, unionization, professional associations, retirement, workplace training, institutional cultures, equity and recruitment. This is an advanced course in workplace and employment policies in the private and public sectors. Students will consider a subset of workplace and employment policy issues in depth and at a high analytical level. 3 cr, 3 lec. Prerequisite: PUBP 3602U.

PUBP 4603U Advanced Housing Policy. This course is an introduction in Canadian housing policy. Some of the areas that may be covered include: the development of public housing, rent controls, public housing policies, home ownership, and cooperative housing. This is an advanced course in Canadian Housing policy. Students will consider a subset of housing development issues in depth and at a high analytical level. 3 cr, 3 lec. Prerequisite: PUBP 3603U.

PUBP 4700U Advanced Topics in Technology and Society. This course will engage students in an advanced exploration of the relationship between technology and society, in historic, contemporary, and future contexts. Drawing on the various bodies of sociological literature and practical examples confronted throughout the program, an emphasis will be placed on the role of technology is shaping social institutions as well as impacting interpersonal communication and relationships. Students can expect the course to focus on diverse topics, such the impact of the Internet, the automobile, warfare technology, film and other media technology, and surveillance technologies. Emphasis will be on developing the ability to critically examine the potential future role of technology in society, as both an agent of social harm and general social change. 3 cr, 3 lec. Prerequisite: PUBP 3700U.

PUBP 4900U Evaluation Research. This course will examine evaluation research in its working contexts. Students will analyze the institutional and organizational requirements for summative and formative evaluation. The use of multiple research methodologies will be explored in relation to their appropriateness and their credibility with different audiences. 3 cr, 3 lec. Prerequisites: SSCI 2910U, SSCI 2920U.

RADI 2100U Radiological and Health Physics. This course is designed to teach the fundamental principles and numerical calculation aspects of health physics. Topics include atomic and nuclear structure, radioactivity, radiation interaction with materials, radiation dosimetry, biological effects of radiation, internal and external radiation protection, health physics instrumentation, criticality safety, radiation protection guidance criteria and protective measures. In addition, the student will learn the fundamentals of non-ionizing radiation protection (for example, laser safety). By the end of the course the student will understand the differences between the various types of radiation, how to detect the various forms of radiation, their biological interactions and effects, ways to reduce exposure (shielding distance, time), the As Low As Reasonably Achievable (ALARA) principle (and derivatives) and how to perform exposure calculations. 3 cr, 3 lec, 2 tut (biweekly). Prerequisite: ENGR 2500U or PHY 2060U. Corequisite: RADI 2110U. Credit restriction: ENGR 2950U.

RADI 2110U Health Physics Laboratory. This course is designed to complement the course entitled Radiological and Health Physics. The intent of the course is to teach students how to properly utilize various items of health physics instrumentation. Included in this list are the broad categories of radiation survey equipment, laboratory analysis equipment, radiation dosimetry, air sampling, and personal protective equipment (PPE). In addition, the students will learn how to properly perform and record the QA associated with health physics measurements, with emphasis on medico-legal aspects of their measurements. 3 cr, 1 lec, 3 lab. Prerequisite: ENGR 2500U or PHY 2060U. Corequisite: RADI 2100U.

RADI 3200U Medical Imaging. The physical principles of imaging techniques with medical applications will be covered. It will be shown how the different physical phenomena can be manipulated to generate clinically relevant images. The following imaging modalities will be presented: Ultrasound, Planar X-ray, Computed Tomography, Single-Photon Emission Tomography, Positron Emission Tomography and Magnetic Resonance Imaging. General image characteristics and basic image processing techniques will also be covered. Topics in wave physics, interaction of radiation with matter and medical radioisotope production will be covered as needed. 3 cr, 3 lec. Prerequisite: ENGR 2950U or RADI 2100U. Credit restriction: PHY 4100U.

RADI 3530U Introduction to Radiological and Health Physics. This course provides an overview of the science and application of radiation in society and the practice of health physics. The course is delivered in the form of a series of modules presented by instructors actively engaged in the practice and research fundamental to the section topic and supported by industry and government scientists where possible. Section topics cover radiation protection in the nuclear power workplace; radiation and the environment; medical applications of radiation for diagnosis and therapy; health physics for nonproliferation of nuclear weapons and radiological event management; and industrial applications of radiation science. The importance of safety in general and some of the unique aspects of radiation safety in particular are emphasized. 3 cr, 3 lec. Credit restriction: ENGR 3530U, NUCL 1530U.

RADI 3690U Radiation Chemistry and Processing. This course introduces students to work with radioactive materials, to determine the activities of such compounds and the parameters that affect the radioactivity of materials. The effects of various types and intensity of radiation on organic and inorganic materials, and on living organisms are studied. Students will consider beneficial changes to the properties of materials subjected to radiation, including the irradiation of food and other consumer products. 3 cr, 3 lec, 1 lab, 1 tut. Prerequisites: BIOL 2840U, CHEM 1020U, ENGR 2500U. Corequisite: ENGR 2220U.

RADI 4040U Material Analysis using Nuclear Techniques. This course concentrates on the application of radiation techniques to the analysis of materials, including the structure and composition of various objects. An important area of application is the detection of materials that represent a threat to security, safety, health and the environment. Topics studied include: principles, methodology; instrumentation and characteristics of nuclear analytical techniques; radiotracers; thermal and fast neutron activation techniques; prompt gamma radiation measurement techniques; measurement of gamma radiation from inelastic neutron collision; track-etch techniques; X-ray fluorescence techniques; radiometric analysis; activation analysis using neutrons, protons and photons; characterization of atmospheric particulates; measurement of heavy metal concentration in water and soil; cost-effectiveness of various on-destructive testing methods. 3 cr, 3 lec, 2 lab. Prerequisites: ENGR 2220U, ENGR 4430U.

RADI 4220U Radiation Biophysics and Dosimetry (formerly RADI 3220U). This course will concentrate on providing the biophysical basis for radiation effects and health risks and the implications for ionizing radiation dosimetry and radiation protection. The course will cover the following topics; the physics of the interaction of radiation with matter; radiation damage at the molecular, sub-cellular and cellular level; tissue damage and health effects in humans; radiation quality; regulatory requirements and radiation protection dosimetry. The primary goals are to teach students the fundamental mechanisms of radiation interactions at the molecular and cellular levels and the various biological endpoints that can result. Current concerns and controversy concerning the effects of low-dose exposures will also be covered in this course. 3 cr, 3 lec, 2 tut (biweekly). Prerequisites: BIOL 2840U or BIOL 2030U, RADI 2100U, or ENGR 2950U.

RADI 4320U Therapeutic Applications of Radiation Techniques. A study of the uses of various types of radiation for therapeutic applications, including Xrays, gamma radiation, electrons, neutrons, lasers, UV, visible, infrared, radio-frequency, and microwaves. Topics include: production of radiation for therapeutic purposes; external beam radiotherapy, brachytherapy, electron beam therapy, boron neutron capture therapy, heavy ion therapy and photodynamic therapy; therapeutic dose calculation and measurement; dose calculation algorithms, treatment planning, optimization and verification; equipment calibration; dose impact on patients and workers. 3 cr, 3 lec, 2 lab. Prerequisite: ENGR 2950U or RADI 2100U.

RADI 4430U Industrial Applications of Radiation Techniques. An introduction to application of ionizing and non-ionizing radiation to industrial probing, gauging, imaging and monitoring. Topics include: monitors (smoke detectors, radon monitors), density gauging using alpha, beta and gamma radiation; thickness gauging using charged particles, photons and neutrons; fluid flow and void fraction measurements, element and content analysis using neutron activation analysis and fluoroscopic excitation, Mossbauer spectroscopy, industrial radiography and computed tomography using photons and neutrons; emission tomography, ultrasound and eddy current flaw detection. 3 cr, 3 lec, 2 lab. Prerequisites: ENGR 3740U, RADI 4550U.

RADI 4440U Radioisotopes and Radiation Machines. This course describes the various methods by which radiation can be produced (isotopic and electronic), and explains the operating principles, design and construction of machines utilizing radiation sources. An introduction to radioisotope production methods is given, along with the fundamentals of enrichment schemes. Design of machines that produce gamma, neutron, electron-beam, ion-beam, photon, laser and ultra-violet radiation are discussed. Specific aspects of radiation machines studied include the detectors used for high-energy radiation, low and high vacuum technology, high voltage power supplies, electron and ion beam generation, electron lens system, and the mechanisms of particle acceleration. Included in the discussion will be safety aspects regarding these machines. 3 cr, 3 lec, 2 lab (biweekly). Prerequisite: ENGR 2950U or RADI 2100U.

RADI 4550U Radiation Detection and Measurement (formerly RADI 3550U). In this course students learn how to measure radiation. They study the meaning and significance of the units for measuring radiation, the equipment that can be used to detect radiation, and the mathematical techniques used to interpret various detector readings. Topics covered include the nature and safe handling of radiation sources; measurement of source strength; the statistics of radiation counting; characteristics and utilization of various radiation detectors; radiation spectroscopy with scintillation detectors; semiconductor detectors; in-core and out-of- core neutron detectors; spectroscopy of fast neutrons; the application of radiation detectors and instrumentation; use of dosimeters; characteristics and utilization of radiation detectors devices needed for various radiation measurements; principles of nuclear instrument operation; factors considered to select nuclear instruments. 3 cr, 3 lec, 2 lab. Prerequisites: ENGR 2500U, ENGR 2950U or RADI 2100U, RADI 2110U.

RADI 4995U Thesis Project I. The thesis project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study, to satisfy specific objectives and requirements. The project topic will be selected to include some aspects of the student's specialization. Students will be required to organize and conduct a project with a significant analytical component, including consideration of technical, economic, environmental and other societal impacts. Thesis Project I will typically be a group project, but with each student having clearly defined roles, objectives and outcomes. The requirements include a written paper and a group presentation of the project outcomes. 3 cr, 1 lec, 4 lab, 1 tut. Prerequisite: Dean or dean's designate's permission. Students must have completed all courses up to and including third year and be in clear standing.

RADI 4999U Thesis Project II. The thesis project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study, to satisfy specific objectives and requirements. The project topic will be selected to include some aspects of the student's specialization. Students will be required to organize and conduct a project with a significant analytical component, including consideration of technical, economic, environmental and other societal impacts. Thesis Project II will typically be an individual research or design project, although with the approval of the professor, a significant and clearly delineated individual contribution to a group project is acceptable. The requirements include a written paper and an individual presentation of the project outcomes. 3 cr, 6 lab. Prerequisites: RADI 4995U and dean or dean's designate's permission.

SCCO 1000W Science Co-op Work Term I. A science-related co-op position available only to students in Co-operative Education. Must be approved by the Faculty of Science. This course is graded on a pass/fail basis. 3 cr, 1 hour lec.

SCCO 2000W Science Co-op Work Term II. A science-related co-op position available only to students in Co-operative Education. Must be approved by the Faculty of Science. This course is graded on a pass/fail basis. 3 cr, 1 hour lec.

SCCO 3000W Science Co-op Work Term III. A science-related co-op position available only to students in Co-operative Education. Must be approved by the Faculty of Science. This course is graded on a pass/fail basis. 3 cr, 1 hour lec.

SCCO 4000W Science Co-op Work Term IV. A science-related co-op position available only to students in Co-operative Education. Must be approved by the Faculty of Science. This course is graded on a pass/fail basis. 3 cr, 1 hour lec.

SCCO 5000W Science Co-op Work Term V. A science-related co-op position available only to students in Co-operative Education. Must be approved by the Faculty of Science. This course is graded on a pass/fail basis. 3 cr, 1 hour lec.

SCIE 1910U Science in Context. A survey of selected topics from biology, chemistry, computing science, mathematics, and physics, and their significance in today's context. This course is designed for nonscience students and cannot be used for credit towards a science degree. 3 cr, 3 lec.

SCIE 1920U Introduction to Astronomy. This introductory course on the Astronomy of the Solar System is specifically designed for non-science students with an interest but no background in astronomy. In this non-quantitative course (no mathematical background is assumed), students will gain a conceptual understanding of Astronomy. This course's objectives are to learn the basics of Astronomy, our place in the Universe, and to gain insight into modern Astronomy endeavours. Students will get a flavour of its exciting scientific content, challenges and fast pace of ongoing astronomical research, in addition to its role in the history of civilization, and its influence on progress in technology and culture. 3 cr, 3 lec. Credit restriction: PHY 1010U, PHY 1030U, PHY 2900U, SCIE 1900U.

SCIE 3010U Philosophy of Science. This course introduces the student to the philosophy of science broadly conceived. No other form of knowledge affects our lives more than science; as such, we have a responsibility to examine science, and to better understand how it affects us. Scientific inquiry and practice does not simply stop at the laboratory or field work; it permeates our daily existence. The main purpose of this course is to enable students to understand the structure, practice and business of science, and to recognize and understand the resulting philosophical implications. Both natural and social science will be considered, with emphasis on the former. 3 cr, 3 lec. Prerequisite: Any 2000-level BIOL, CHEM, or PHY course.

SCIE 3920U Stars, Galaxies, and Beyond. This course presents a look at the Universe beyond our solar system. A qualitative exploration of starts, galaxies, cosmology, the Big Bang and the search for life beyond the Earth. This course is intended as an elective for all students of any discipline who have taken at least one Astronomy course. 3 cr, 3 lec. Prerequisites: SCIE 1900U or SCIE 1920U or PHY 2900U.

SOCI 1000U Introductory Sociology. Sociology is the study of people and how they interact with each other and various social groups. This course deals with the study of people's lives, their relationship to society as a whole, and how people are affected by the society in which they live. The concepts, theories and methods of the discipline will be introduced and discussed with particular emphasis on the dynamics of Canadian society and Canadian social problems. 3 cr, 3 lec.

SSCI 1000U Introduction to Criminal Justice. This course provides an analysis of historical and contemporary theory and practices of the criminal justice system. Beginning with the analysis of crime data, the course will also examine the role and function of the each component of the criminal justice system: the police, the court system, corrections, prisons and alternatives to prisons. 3 cr, 3 lec.

SSCI 1010U Introduction to Canadian Legal System. This is an introductory course that provides students with an overview of the nature, principles, sources, systems and types of law as well as its role in society. It critically examines the basic tenets of Canadian law in its historic and contemporary context. In addition to general introduction to law and legal system, the course covers specific topics such as the Canadian Charter of Rights and Freedoms, criminal law, family law, law of contract, law of torts and human rights issues. The impact of law on various groups in society and the role of law in social change will also be discussed. 3 cr, 3 lec.

SSCI 1200U Introduction to Social Policy. This is a core course in social policy analysis, in which students will explore a variety of social policy issues. They will trace the historical evolution and contemporary contours of public and private sector policies in Canada. The social structural contexts shaping the development of social policy in modern Canadian society will be a focus. The role of social science data and research in the formation of private and public sector policies will be discussed. 3 cr, 3 lec.

SSCI 1210U History of Science and Technology (formerly EDUC 1200U). This course will focus on the history and philosophy of science and engineering with special emphasis on scientific technology and the cultural significance of technology to civilization. The course will include critical analyses and will pay significant attention on the nature and problems of industrial technology, benefits and risks of technological progress, and issues around intellectual property. Throughout, students will examine the history and philosophy within the context of science and engineering as learned professions. 3 cr, 3 lec. Credit restriction: EDUC 1200U.

SSCI 1300U Social Problems (formerly PHIL 1000U). This course introduces students to the analysis of social and political problems using different theories, concepts and methods. These theories and the way in which people approach political and social problems are often based upon a particular view of the concept of justice and equality. We examine different social and political issues and show how they interact with both theory and practice in dealing with these conceptions of justice and equality. The course looks critically at gender, race, class and age among other barriers to achievement. 3 cr, 3 lec.

SSCI 1470U Impact of Science and Technology on Society (formerly EDUC 1470U). In this course, students will engage in analyses of scientific and technological developments from the perspective of broad social impacts. Special attention will be paid to controversial issues currently receiving media attention, but the major emphasis will be on ways of thinking critically about both the remediation of already existing problems (e.g. toxic substance cleanup) and the prevention of future problems (e.g. environmental impact analyses and or economic impact analyses). Canadian examples will be of primary concern, but students will also learn to think about impact globally since large-scale problems do not respect political boundaries. 3 cr, 3 lec. Credit restriction: EDUC 1470U.

SSCI 1910U Writing for the Social Sciences. This course is intended to help students develop and/or enhance writing skills that will increase their likelihood of success within the social sciences. Students will learn how to research academic papers, how to critically assess and use resources and how to write different styles of papers. Throughout, emphasis will be on improving writing through such mechanisms as outlining, drafting and critically assessing their own work. 3 cr, 1.5 lec, 1.5 tut.

SSCI 2010U Criminal Law. This course examines the nature, purpose, scope, sources and basic principles of criminal law within their historical and contemporary context. Among the topics are the constitutional foundations and due process of law, offences under the Criminal Code, available defences and principles of sentencing. The impact of law on various groups in society and the role of law in social control and social change will also be discussed. Students will gain substantive knowledge of Canadian criminal law as well as develop a critical perspective on issues of criminal law. 3 cr, 3 lec. Prerequisite: SSCI 1010U.

SSCI 2011U Immigration and Refugee Law (formerly Customs and Immigration Law). This course provides students with an overview of the Canadian immigration and refugee protection systems. It critically examines the basic tenets of immigration and refugee law in its historic and contemporary context. Among the topics are theoretical approaches to inclusion and exclusion; categories of persons in immigration law, classes of immigrants, temporary residents; persons seeking refugee protection in Canada under the Immigration and Refugee Protection Act; border control and enforcement. Students will develop a critical perspective on the above issues and will examine the role the law plays in shaping approaches to membership in Canadian community. 3 cr, 3 lec. Prerequisite: SSCI 1010U.

SSCI 2020U Issues in Diversity. Students will identify and critically analyze issues of diversity. The course will incorporate an inclusive approach to diversity, including but not limited to race, gender, class, sexual orientation and disability. Learners will focus on topics pertaining to the achievement of and barriers to equity in various social settings, such as education, employment, and housing. Students will be particularly encouraged to identify strategies for individual and community empowerment 3 cr, 3 lec. Prerequisite: SOCI 1000U or PSYC 1000U.

SSCI 2021U Issues in the Family. The purpose of this course is to introduce the student to problems in the family and their relation to the justice system. In addition to gaining knowledge of the theoretical perspectives used to study the family, the student will also learn about such issues as the relation between family and work, parenting, family interactions, and legal issues within the family. The legal issues to be discussed include family violence, divorce and remarriage, and the creation of social policies as they impact on the family. 3 cr, 3 lec. Prerequisite: SOCI 1000U or PSYC 1000U.

SSCI 2025U Youth Cultures. This course provides an introduction to the complexities of Youth Culture in modern societies. Learners will explore a diverse range of themes including changes that have occurred between past and contemporary subcultures, how youth identities have been constructed in relation to mass media, the arts, society, politics, consumerism; and the intersections between youth culture and commodification as expressed in music, fashion and technology. Current social issues such as multiculturalism, sexuality, drugs and the rise of gun culture will also be examined. There will be opportunities for students to contrast and compare their own experiences with those of other youth. Lectures will be supported with guest speakers and media resources. 3 cr, 3 lec. Prerequisite: SOCI 1000U.

SSCI 2030U Social Control. This course will examine theoretical and empirical approaches to the study of social control, which might be understood as the ways in which societies respond to behaviour deemed inappropriate, deviant, or even criminal. Our focus will be on both informal and formal methods of social control, and the inter-relationship among them. We will discuss the cultural, structural, political, and ideological forces that have sustained and transformed both systems of social control during modernity and late modernity. Particular attention will be paid to the ways in which identity (e.g. race, class and gender) shapes one's relationship to these mechanisms of social control. 3 cr, 3 lec. Prerequisites: SOCI 1000U, SSCI 1000U.

SSCI 2031U Alternative Methods in Justice (formerly SSCI 4031U). This course will introduce students to methods of intervention applied in the justice field. It will use methods of problem solving to identify the appropriate intervention to solve the problem. Methods of intervention covered will include negotiation, mediation, arbitration, debriefing, crisis/conflict management and group process facilitation. Simulation labs and activities are included. Students will be expected to demonstrate an advanced level of understanding based on their previous course work of concept justice as it is found in common law systems, civic law systems and socialist systems. 3 cr, 3 lec. Prerequisite: SSCI 1000U. Credit restriction: SSCI 4031U.

SSCI 2050U Rights and Freedoms in the Justice System. This course considers the development of rights internationally and in Canada. After introducing the Charter of Rights, the course moves on to explore rights in action within the context of the justice system. It explores current issues that may place limits on the free exercise of rights in Canada, with special emphasis on legal and political rights. 3 cr, 3 lec. Prerequisite: SSCI 1000U or SSCI 1010U.

SSCI 2810U Sociological Theories of Crime. This course reviews the various sociological theories of crime and criminalization, beginning in the early 1800s to contemporary times. It will review the classical, early positivist, structural functionalist, interactionist, critical and feminist theories of crime. Additional topics include competing definitions of crime and the structural determinants of crime. 3 cr, 3 lec. Prerequisite: SOCI 1000U.

SSCI 2830U Justice Theory and Policy. This course considers social and political theories, law and justice and their implications for policy development in the justice system. It explores the diverse nature of the theory within the field of crime and deviance by focusing on modern and post-modern theories. The selected paradigms are studied with regard to their explanatory domain, role in examining social and criminological problems and the development of policies. 3 cr, 3 lec. Prerequisites: SSCI 1000U or SSCI 1010U, SOCI 1000U or PSYC 1000U. Credit restriction: PSYC 2830U.

SSCI 2831U Critical Race Theory. Critical race theory, a term unknown two decades ago, is now a field with a growing interest, vocabulary, and literature. This course will consider the history, theoretical underpinnings, and implications of CRT. Students will read some of the groundbreaking texts in CRT, as well as some of its precursors. Beginning with readings in legal literature, we will then venture into theoretical constructs in feminism and postmodernism that inform critical race theory. 3 cr, 3 lec. Prerequisites: SOCI 1000U, SSCI 1000U.

SSCI 2840U: Introduction to Gender, Sexualities, and Justice Studies. This interdisciplinary course will provide an overview of the key texts, topics, debates and politics that inform the intersecting fields of gender and sexuality studies. Students will learn about the history of gender and sexuality studies; variation in the social construction and representation of gender and sexuality over time and context; how gender and sexuality intersect with other social categories like race, class, ability and age; as well as about contemporary debates about gender, sexuality and justice. 3 cr. 3 lec. Prerequisite: SOCI 1000U.

SSCI 2900U Research Methods. This course is designed as an introduction to research methods in criminology and the social sciences. Students will develop practical experience in a variety of research methods and techniques. Quantitative and qualitative research methods will be examined. Students may choose a research question from an area of personal or professional interest to pursue in the course. 3 cr, 3 lec, 2 lab. Prerequisite: SOCI 1000U or PSYC 1000U.

SSCI 2910U Quantitative Methods. This course offers an introduction to quantitative research methods in criminology and social sciences. Topics to be included are: frequency distributions, measures of central tendency and variability, correlation and regression, elementary sampling theory and tests of significance. The application of statistical methods to the study of justice questions will be examined in depth with examples from the literature. Activities in this course are designed to build on those in the Research Methods course. 3 cr, 3 lec, 2 lab. Prerequisite: SSCI 2900U. Credit restrictions: BUSI 1450U, STAT 2010U, STAT 2020U, STAT 2800U, HLSC 3800U.

SSCI 2920U Qualitative Research Methods. This course is a survey of qualitative research methods. Students will be introduced to the historical, theoretical, epistemological, and ethical foundations of qualitative research. The course will provide a survey of major qualitative approaches such as: interview, focus group, observation, unobtrusive methods, and action research. 3 cr, 3 lec. Prerequisite: SSCI 2900U.

SSCI 2930U Geographic Information Systems. This course is an introduction to the use of Geographic Information Systems (GIS) in the social sciences. Students will work with a GIS software package and learn how to translate, input and display data. Multiple layer mapping and data analysis will be introduced. Some of the main applications of GIS in the social sciences will be demonstrated, such as: criminal activity mapping, social planning and community profiling. 3 cr, 2 lec, 2 lab. Prerequisite: SSCI 2900U.

SSCI 3010U Social Justice and Conflict. This course will examine justice from a social perspective by considering various cultural and ethnic groups' experiences with the law and the justice system (broadly defined). The diverse make-up of Canadian society is considered in the domains of social and criminal justice. This stratification is analyzed in relation to socio-cultural conflict in Canadian society. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U, or LGLS 2200U or PSYC 2030U).

SSCI 3020U Corporate Crime. This course is designed to identify the nature and issues of corporate crime. It will conduct a critical analysis of the types of corporate crime including its associated white collar crime. The course will review the classic studies on corporate crime beginning with the work of Sutherland and continuing to contemporary theories. The course will also examine issues related to the control of white collar crime by both legal and non-legal means. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI2920U or SSIC 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3021U Cybercrime. This course is designed to identify the nature and issues of computer or cybercrime. It will examine the opportunities for cybercrime created by increase reliance on information technology. Specific topics might include cyberterrorism, creation and distribution of viruses, and hacking. It will also examine hacking as both a problem in need of control and a means of controlling cybercrime. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3022U Hate Crime. This course explores theoretical and practical issues related to understanding the dynamics of hate crime, and the legal and non-legal strategies that are used to respond to it. It will examine an array of motivating factors, such race, gender, and religion, and the effects that hate crime has on its victims. It will also examine the perpetrators of hate crime. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3023U Domestic Violence. The course will cover the history of domestic violence as a social problem; its dynamics, prevalence, and outcomes; critical issues in conducting and interpreting research; media representations of violence; the intersection of violence and social categories; violence related services; and contemporary domestic violence policy. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3024U Criminal Gangs. This course examines the variety and extent of criminal gang activity. It will offer an analysis of the definitions of gangs, theoretical models used in the study of gangs, the social context that leads to gang formation, variations in gang structures and purposes, and various methods for controlling and policing gangs in Canada and elsewhere. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or

SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3025U Victimology. This course will take an integrated approach to victimization examining the scope and impact of crime on victims as well as the experience of victimization as a whole. An historical review of the role of the victim, the evolution of victims' rights in Canada, and formal and informal responses to victimization will be studied. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3026U Issues in Organized Crime. This course is designed to identify the nature and issues of organized crime in all societies. It will conduct a critical analysis of the types of organized crime including terrorism. The analysis will be grounded in theory and an applied research approach, which will emphasize a multi-disciplinary approach to identifying and recommending solutions to the problem. It will examine jurisdictional issues and begin to consider a multidisciplinary approach to the issue. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3027U Youth, Crime and Violence (formerly Youth Crime). This course attempts to place the study of youthful offending within a broad context. Youth violence will be examined as both a social phenomenon and a policy problem. This will include a discussion of issues such as adolescent firearm possession and use, standards for sentencing youth as adults and legal sanctions for adolescents who kill. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3028U Women in the Criminal Justice System. This course examines issues impacting women in the criminal justice system. It examines a wide range of issues ranging from women as victims of crime, to women as criminal offenders, to women as police and other types of criminal justice workers. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3029U Understanding Recidivist Criminals. This course will explore theoretical and methodological issues related to understanding the scope and nature of recidivist criminals. The course will examine the sociological and psychological theories of recidivism, as well as problem of defining recidivism. It will also examine the most frequently cited typologies of recidivism criminals, and differences between the various types of recidivists. Specific types of recidivist criminals to be examined include drug users and traffickers, prostitutes and pimps, corporate criminals, burglars, career thieves, arsonists, and paedophilia. The methods used to detect and apprehend these criminals will also be discussed. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3030U Crime in Sport. This course will examine the connections between criminal activity and organized sports, both professional and amateur. Specific issues to be examined include the involvement of sports celebrities in illegal activities such as gambling and drug use, as well as other types of criminal activities ranging from rape and assault, to domestic violence. The purpose will be to put these activities in theoretical focus. 3 cr. Prerequisite: One of: SOCI 1000U or PSYC 1000U or POSC 1000U or PHIL 1000U or PHIL 1010U or SSCI 1000U.

SSCI 3035U Representations of Crime and Justice. This interdisciplinary course will provide an introduction to the critical study of depictions of crime and justice in the media. The course will devote significant attention to the intersectionality of race, class, and gender. 3 cr. 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3037U Youth Justice Policy. This course provides students with an understanding of the contours and purposes of various juvenile justice systems in selected countries, including Canada, through examination of various cases, legislative initiatives and social forces that have affected juvenile justice policy in these countries. In addition to examining the evolution of these juvenile justice systems, learners will examine changing approaches to the policing and adjudication of juvenile offenders, as well as the transformation of juvenile courts. Finally, students will gain an understanding of contemporary issues in juvenile justice in Canada and elsewhere, and an appreciation for the policy and analytical value of comparative methods. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3039U Children, Psychology and the Law. Through an examination of relevant criminological, psychological, and legal literature, this course will explore the manner in which children come in contact with the law. It will examine children's diverse roles in the courts in the context of domestic and international law. It will highlight the contradictory ways in which children are defined, protected and prosecuted by the law by examining important case law and relevant legal precedent. 3 cr, 3 lec. Prerequisites: PSYC 2010U, (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3040U Restorative Justice. This course examines the roots, principles, core assumptions and current practices of restorative justice in Canada and globally. Students are exposed to how restorative justice is a profoundly different approach to resolving crime and conflict. The course examines the needs and roles of key stakeholders (victims, offenders, communities, justice systems), and outlines some of the primary models of practice. It also identifies current challenges, dangers, and pitfalls of restorative justice. Future strategies of restorative justice will also be examined. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U) and (two of SSCI2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U). Credit restriction: PSYC 3040U.

SSCI 3045U Terrorism. This course will explore theoretical and practical issues related to understanding terrorism and the state and public responses to it. It will review theoretical and methodological issues in the study of terrorism, as well as the social, political and economic roots of terrorism. The course will conclude with examination of strategies used in the control of terrorist activities and the implications these have for public safety and for human rights. 3 cr, 3 lec. Prerequisite: SSCI 3050U.

SSCI 3050U Policing. This course examines the contemporary shifts in the institutions, strategies and practices of “policing” that have taken place in North America and other parts of the world. These changes in policing are viewed in relation to their broader social, political, and economic context with particular emphasis placed on how these developments have been understood and explained by various scholars. The future challenges and prospects for policing, as well as the implications for democratic values such as justice, equality and civil liberty, are considered. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3052U Policing Diverse Communities. This course will explore issues related to policing culturally diverse communities in Canada. In particular, students will explore the relevance of cultural differences between minority cultures and the assumed dominant culture for policing. Thus, it will introduce students to the origins and manifestation of bias and discrimination in policing, the use of police force, discretionary powers, police ethnic community relationships, and the utility of government appointed race and ethnic relations commissions. Further, it will explore efforts to enhance police/community relations, and their strengths and limitations. 3 cr, 3 lec. Prerequisite: SSCI 3050U.

SSCI 3053U Prosecution and Sentencing. This course will cover the historical evolution of the modern prosecution process and the theories and practices of judicial decision making. Analysis and cross-national comparisons of how criminal cases are processed through the court system will focus on the accountability of prosecutorial and judicial/court decision-making, and alternatives to the these decision making processes, including examination of appeal courts decision making and alternative or emerging paradigms for decision making. The course will also examine issues related to types of sentencing options available to judges including but not limited to sentences that include electronic monitoring, boot camps, the use of fines, probation orders, community service orders, and incarceration. Lab and simulations for evidence processes, prosecution and trial processes are included. 3 cr, 3 lec. Prerequisite: SSCI 3050U.

SSCI 3056U Race and Ethnicity in the Criminal Justice System. This course explores the disparate experiences of ethnic and racial minorities within the criminal justice system. Emphasis will be placed on the raced nature of contemporary criminal justice policies. Together, the professor and the students will assess and critique the relationship between race and criminal offending, victimization and sentencing. 3 cr, 3 lec. Prerequisites: SOCI 1000U, SSCI 1000U.

SSCI 3060U Punishment and Society (formerly Corrections). This course is a review of punishment sanctioned and undertaken by the state. It examines important philosophical questions about all forms of punishment, regulation and control. It will review the historical debates about punishment, and will map out the political struggles and cultural shifts that led to the establishment of prisons as the pre-eminent modern form of punishment. In addition, it will consider not only how prisons are administered but how they are experienced. Finally, the course will consider non-punitive responses to wrongdoing and rule breaking. 3 cr, 3 lec. Prerequisites: (two of SSCI 2900U or SSCI 2910U or SSCI 2920U or SSCI 2930U or LGLS 2940U), (two of SSCI 2810U or SSCI 2820U or SSCI 2830U or LGLS 2200U or PSYC 2030U).

SSCI 3062U The Prison Experience. The focus of this course is the study of prison life. It will review a number of classic sociological studies in which the prison has been recognized as a world set apart, one with unique cultures, demands and processes. This course will examine the experiences and lived realities of prisoners and prison staff, which include strategies of adjustment and survival and the prevalence of violence in prison. Finally, it will discuss the ways in which inmates negotiate and resist the experience of power, discipline and formal social control. 3 cr, 3 lec. Prerequisite: SSCI 3060U.

SSCI 3200U Public Administration. This course introduces the student to some of the basic concepts of Canadian public administration and provides an analysis of organizational and policy theories and relates them to public administration in Canada. The administrative workings and the interaction of federal, provincial and municipal agencies are explored. The makeup and purpose of the bureaucracy as well as the political framework within which the bureaucracy works are examined. The focus will be on organizational, management and policy dimensions as well as the ethical, equity and human elements that present challenges for public administration. 3 cr, 3 lec. Prerequisites: POSC 2000U, PUBP 2200U.

SSCI 3910U Advanced Quantitative Methods. This is an advanced quantitative research methods. Students will explore quantitative techniques in the context of common research problems in the social sciences. There will be an emphasis on developing overall research strategies and protocols using quantitative methods. Computer applications for quantitative analysis will be used extensively. 3 cr, 2 lec, 2 lab. Prerequisite: SSCI 2910U.

SSCI 3920U Advanced Qualitative Methods. This course provides an opportunity to learn about selected qualitative methods in depth and gain practical experience applying them to a research project. Students will learn how to plan and conduct a qualitative research project from start to finish. Historical, theoretical, epistemological, and ethical foundations of selected methods will be explored in depth. 3 cr, 3 lec. Prerequisite: SSCI 2920U.

SSCI 4000U Advanced Justice Studies. This capstone course will provide an opportunity for critical analysis of specific justice topics. Students will be expected to synthesize material from previous courses and apply it to a social justice issue, demonstrating significant mastery of justice concepts, theory and research. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Criminology and Justice.

SSCI 4005U Independent Study. The course provides students with the opportunity to engage in in-depth study of a specific topic within the discipline. This will involve individual reading and scholarship at an advanced level under faculty supervision. Students will conduct an extensive literature review and write a major essay/critique of the relevant literature. Instructor and dean's consent required. Limited seats available. 3 cr. Prerequisite: Fourth-year standing with a cumulative 3.7 (A-) or greater GPA.

SSCI 4010U Policy Development (formerly Policy Analysis in Justice Studies). This capstone course explores various aspects of policy development, planning and analysis as they relate to social policy and justice policy. It will compare and contrast theories of policy implementation and analyze and evaluate social policies. Students will consider how economic, political, legal, and cultural forces shape the construction of social policy. Students will be expected to demonstrate an advanced level of understanding based on their previous courses, and apply that to the creation of a policy initiative. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Criminology and Justice, Public Policy or Community Development.

SSCI 4020U Leadership and Administration. This course introduces students to the nature and structure of organizations and the behaviour of individuals and groups within organizations. Particular emphasis will be placed on the development of leadership skills within those organizations. The knowledge and skills developed will be applicable to a wide range of settings in both the private and public sector. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Criminology and Justice, Legal Studies, Public Policy or Community Development.

SSCI 4025U Children's Rights. This course will examine the discrepancy between theory and practice in the field of children's rights from both a national and international perspective. Central topics for the course are: children in conflict with the law, child labour, child participation and non discrimination. The UN Convention on the Rights of the Child (UNCRC) and its implementation will be examined throughout the course along with the active work by governments, NGOs, agencies and other human rights movements. 3 cr, 3 lec. Prerequisite: Fourth-year standing in any Faculty of Social Science and Humanities program.

SSCI 4026U Advanced Topics in Race, Ethnicity and Justice. This is an advanced course exploring the racialized dynamics of crime and crime control. It is thematically driven so the focus will vary from semester to semester. Possible topics may include racial profiling; race and policing; race and incarceration. 3 cr, 3 lec. Prerequisite: SSCI 3056U.

SSCI 4032U Theory and Practice of Mediation. This course will examine the theory and practice of mediation in the justice field. It will consider the history and influences on the development of mediation practices. Mediation will be contrasted with formal litigation and other dispute resolution processes. Issues of social and legal control will be considered and critiques of the process from a feminist, Marxist, critical race theory and cross-cultural perspective will be considered. Mediation practices and skills will be applied to contemporary issues and disputes. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Criminology and Justice, or third-year standing in Legal Studies.

SSCI 4065U Criminal Justice Ethics and Misconduct. This course is an exploration of professionalism and decision making in criminal justice through the lens of ethics, professional codes of conduct and leadership in organizations. The course will lay a foundation for exploration through a comprehensive survey of various ethical theories and leadership theories. With this foundation, the students will examine their own decision making process and apply these theories to current problems and issues facing criminal justice professionals. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Criminology and Justice.

SSCI 4075U International Perspectives on Criminal Justice. This course encourages students to think about how sociocultural, political and social conditions shape both crime and responses to crime across distinct cultures. It attempts to break down ethnocentric assumptions about crime and its control, countering the pervasive belief that there is one true way to approach justice. Consequently, we examine the diversity of historical and global patterns of crime and its control including international and transnational efforts at crime control. We will also consider the ways in which such processes as colonization, and globalization impose upon the sovereignty of nation states. 3 cr, 3 lec. Prerequisite: Fourth-year standing in Criminology and Justice.

SSCI 4079U Pains of Imprisonment. This course will provide insights into the impacts of incarceration and the potential for thinking beyond this “correctional” option. We will consider the effects of mass incarceration on individuals, families and communities, as well as more just and humane means of intervening in criminality. 3 cr, 3 lec. Prerequisite: SSCI 3060U.

SSCI 4085U Emerging Patterns of Policing. This course examines emerging trends at all levels of policing – public and private; community and military; and the ways in which these trends are embedded in broader patterns of social and technological change. Moreover, students will be encouraged to speculate on “what’s next” in the context of new forms and requirements of policing. Prerequisite: SSCI 3050U.

SSCI 4098U Criminology and Justice Field Work Practicum. The practicum is an experiential learning tool that provides students with opportunities to acquire workplace skills and knowledge, confront the relationship between theory and practice, and cultivate a sense of personal and professional development. The course consists of 100 hours of fieldwork, several in-class seminars, and a set of academic assignments. Students are matched with host organizations based on the goals, interests, and learning outcomes identified in pre-placement interviews (verbal and written). In consultation with a designated fieldwork supervisor, students design, manage, and receive feedback on a series of self-directed workplace goals and objectives. 3 cr. Prerequisite: Fourth-year standing in Criminology and Justice.

SSCI 4099U Criminology and Justice Integrating Project. This course is designed to allow students to develop a project in criminology and justice, which pulls together the key themes of the program, namely, theory, research and policy. Emphasis will be placed on independent scholarly inquiry reflective of a qualitative, quantitative, theoretical, or policy approach. Throughout this process, students will be expected to demonstrate an advanced level of understanding based on their previous course work in this program. The integrating project provides students with the opportunity, under the guidance of a faculty member, to synthesize and apply knowledge gained throughout their program of study. The students will select topics and approaches based on their areas of interest.

SSCI 4101U Honours Thesis I. A specific scholarly project on a well-defined topic, to be determined in consultation with thesis supervisor. Honours Thesis I involves a literature review and the preparation of a thesis proposal for the intending project. Instructor and dean’s consent required. Regular student/ supervisor meetings will be scheduled. 3 cr. Prerequisite: Fourth-year standing with a minimum 3.7 cumulative GPA.

SSCI 4102U Honours Thesis II. A specific scholarly project on a well-defined topic, to be determined in consultation with thesis supervisor. Honours Thesis II is a continuation of Honours Thesis I. This course will require students to complete the project initiated in Honours Thesis I which will involve conducting research and writing a manuscript of publishable quality based on the findings of the research. Instructor and dean’s consent required. Regular student/supervisor meetings will be scheduled. 3 cr. Prerequisites: SSCI 4101U Honours Thesis I with minimum A- and a minimum 3.7 cumulative GPA.

STAT 2010U Statistics and Probability for Physical Science. This course introduces the concepts and techniques of statistics and probability to collect, present, analyze and interpret data, and make decisions in the presence of variability. Students study a selection of topics relevant to biological science, selected from: basic concepts of probability theory: events, sample spaces, probability; basic concepts of discrete mathematics: set theory, propositional logic, combinatorics; probability: marginal probability, conditional probability, independence, discrete and continuous random variables; probability distributions: binomial, Poisson, uniform, normal, etc.; mean and variance; the central limit theorem; statistical inference: estimation, significance tests, confidence intervals; introduction to experimental design; applications to quality control. 3 cr, 3 lec. Prerequisite: MATH 1020U. Credit restrictions: BUSI 1450U, HLSC 3800U, SSCI 2910U, STAT 2020U, STAT 2800U.

STAT 2020U Statistics and Probability for Biological Science. This course introduces the concepts and techniques of statistics and probability to collect, present, analyze and interpret data, and make decisions in the presence of variability. Students study a selection of topics relevant to biological science, selected from: basic concepts of probability theory: events, sample spaces, probability; basic concepts of discrete mathematics: set theory, propositional logic, combinatorics; probability: marginal probability, conditional probability, independence, discrete and continuous random variables; probability distributions: binomial, Poisson, uniform, normal, etc.; mean and variance; the central limit theorem; statistical inference: estimation, significance tests, confidence intervals; introduction to experimental design; applications to quality control. 3 cr, 3 lec. Prerequisite: MATH 1020U. Credit restrictions: BUSI 1450U, HLSC 3800U, SSCI 2910U, STAT 2010U, STAT 2800U.

STAT 2800U Statistics and Probability for Engineers. Sample spaces, probability, conditional probability, independence. Bayes' theorem, probability distributions, algebra of expected values, descriptive statistics. Inferences concerning means, variances, and proportions. Parameter estimation, correlation. Introduction to quality control and reliability. 3 cr, 3 lec. Prerequisite: MATH 1020U. Credit restrictions: BUSI 1450U, HLSC 3800U, SSCI 2910U, STAT 2010U, STAT 2020U.

STAT 3010U Biostatistics. Designed to help students understand and apply the commonly used advanced statistical methods to data that they are likely to encounter in their careers. The emphasis is on the design of research projects, data acquisition, analysis and interpretation of results. Topics to be covered include multiple regression, two factor ANOVA, logistic regression, nonparametric analysis, and re-sampling methods. 3 cr, 3 lec. Prerequisite: STAT 2010U or STAT 2020U.

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