

# 2017-2018 Undergraduate Calendar

The information published in this Undergraduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2017-2018 academic year, including the Summer Semester 2017, the Fall Semester 2017 and the Winter Semester 2018.

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

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

The University is a full member of:

- The Association of Universities Canada

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# Disclaimer

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## University of Guelph 2017

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The information published in this Undergraduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2017-2018 academic year, including the Summer Semester 2017, the Fall Semester 2017 and the Winter Semester 2018.

The University reserves the right to change without notice any information contained in this calendar, including fees, any rule or regulation pertaining to the standards for admission to, the requirements for the continuation of study in, and the requirements for the granting of degrees or diplomas in any or all of its programs. The publication of information in this calendar does not bind the University to the provision of courses, programs, schedules of studies, or facilities as listed herein.

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

In the event of a discrepancy between a print version (downloaded) and the Web version, the Web version will apply.

Published by: Enrolment Services

## Introduction

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### Collection, Use and Disclosure of Personal Information

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

### Disclosure of Personal Information to the Ontario Ministry of Advanced Education and Skills Development

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The University of Guelph is required to disclose personal information such as characteristics and educational outcomes to the Minister of Training, Colleges and Universities under s. 15 of the Ministry of Advanced Education and Skills Development Act, R.S.O. 1990, Chapter M.19, as amended. The Ministry collects this data for purposes including but not limited to planning, allocating and administering public funding to colleges, universities and other post-secondary educational and training institutions.

Amendments made to the Ministry of Advanced Education and Skills Development Act, authorizing the collection and use of personal information from colleges and universities by the Minister of Training Colleges and Universities, which were set out in Schedule 5 of the Childcare Modernization Act, 2014, came into force on March 31, 2015.

The amendments strengthen the ability of the Minister to directly or indirectly collect and use personal information about students as required to conduct research and analysis, including longitudinal studies, and statistical activities conducted by or on behalf of the Ministry for purposes that relate to post-secondary education and training, including,

- i. understanding the transition of students from secondary school to post-secondary education and training,
- ii. understanding student participation and progress, mobility and learning and employment outcomes,
- iii. understanding linkages among universities, colleges, secondary schools and other educational and training institutions prescribed by regulation,
- iv. understanding trends in post-secondary education or training program choices made by students,
- v. understanding sources and patterns of student financial resources, including financial assistance and supports provided by government and post-secondary educational and training institutions,
- vi. planning to enhance the affordability and accessibility of post-secondary education and training and the quality and effectiveness of the post-secondary sector,
- vii. identifying conditions or barriers that inhibit student participation, progress, completion and transition to employment or future post-secondary educational or training opportunities, and
- viii. developing key performance indicators.

Information that the University is required to provide includes but is not limited to: first, middle and last name, Ontario Educational Number, citizenship, date of birth, gender, first three digits of a student's postal code, mother tongue, degree program and major(s) in which the student is enrolled, year of study and whether the student has transferred from another institution.

Further information on the collection and use of student-level enrolment-related data can be obtained from the Ministry of Training Colleges and Universities website: <https://www.ontario.ca/page/ministry-advanced-education-and-skills-development> (English) or <https://www.ontario.ca/fr/page/ministere-de-lenseignement-superieur-et-de-la-formation-professionnelle> (French) or by writing to the Director, Postsecondary Finance and Information Management Branch, Postsecondary Education Division, 7th Floor, Mowat Block, 900 Bay Street, Toronto, ON M7A 1L2.

An update on Institutional and Ministry of Advanced Education and Skills Development Act Notice of Disclosure Activities is posted at <https://www.ontario.ca/page/ministry-advanced-education-and-skills-development>

Frequently Asked Questions related to the Ministry's enrolment and OEN data activities are also posted at: <http://www.tcu.gov.on.ca/peps/publications/NoticeOfCollection.pdf>

#### Authority to Disclose Personal Information to Statistics Canada

The Ministry of Advanced Education and Skills Development discloses student-level enrolment-related data it collects from the colleges and universities as required by Statistics Canada in accordance with Section 13 of the Federal Statistics Act. This gives Ministry of Advanced Education and Skills Development Act authority to disclose personal information in accordance with s. 42(1) (e) of FIPPA

### Notification of Disclosure of Personal Information to Statistics Canada

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

### Address for University Communication

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

#### Email Address

The University issued email address is considered an official means of communication with the student and will be used for correspondence from the University. Students are responsible for monitoring their University-issued email account regularly. See Section I--Statement of Students' Academic Responsibilities for more information.

#### Home Address

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

### Name Changes

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

### Student Confidentiality and Release of Student Information Policy Excerpt

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

Complete policy at <https://uoguelph.civicweb.net/document/68892/ORSInfoReleasePolicy060610.pdf?handle=FF982F8A9AEA4076BE4F3D88147172B8>.

# Learning Outcomes

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On December 5, 2012, the University of Guelph Senate approved five University-wide Learning Outcomes as the basis from which to guide the development of undergraduate degree programs, specializations and courses:

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

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

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

## 1. Critical and Creative Thinking

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Critical and creative thinking is a concept in which one applies logical principles, after much inquiry and analysis, to solve problems in with a high degree of innovation, divergent thinking and risk taking. Those mastering this outcome show evidence of integrating knowledge and applying this knowledge across disciplinary boundaries. Depth and breadth of understanding of disciplines is essential to this outcome.

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

## 2. Literacy

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

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

## 3. Global Understanding:

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

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

## 4. Communicating

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

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

## 5. Professional and Ethical Behaviour

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

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

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## X. Degree Programs

### Specializations and Their Degrees

Specializations and the Degree under which they are offered.

Specialization Name	Specialization Acronym	Honours Program Major	Honours Program Minor	Honours Program Area of Emphasis	General Program	Co-op Program
Accounting	ACCT	BCOMM				BCOMM
Adult Development	ADEV	BASC				BASC
Agriculture	AGR		BSAG BAS			
Agricultural Science	AGRS	BSAG				
Animal Biology	ABIO	BSC				
Animal Science	ANSC	BSAG				
Anthropology	ANTH	BA	BA BAS		BA	
Applied Human Nutrition	AHN	BASC				
Applied Plant Science	APSC			BSCH.PLSC		
Art History	ARTH	BA	BA BAS			
Arts, Culture and Heritage Management	ACHM		BA			
Biochemistry	BIOC	BSC	BSC BAS			BSC
Biodiversity	BIOD	BSC				
Bioinformatics	BINF			BSCH		
Biological & Medical Physics	BMPH	BSC				BSC
Biological and Pharmaceutical Chemistry	BPCH	BSC				BSC
Biological Engineering	BIOE	BENG				BENG
Biological Science	BIOS	BSC			BSC	
Biology	BIOL		BSC BAS			
Biomathematical or Biostatistical Modelling	BBM			BSCH		
Bio-Medical Science	BIOM	BSC				
Biomedical Engineering	BME	BENG				BENG
Biomedical Toxicology	BTOX	BSC				BSC
Biotechnology	BIOT		BSC BAS			
Botany	BOT			BSCH.PLSC		
Business	BUS		BA			
Business Economics	BECN		BA BSC BAS			
Chemical Physics	CHPY	BSC				BSC
Chemistry	CHEM	BSC	BSC BAS			BSC
Child, Youth and Family	CYF	BASC				BASC
Classical Studies	CLAS	BA	BA BAS			
Computer Engineering	CENG	BENG				BENG
Computer Science	CS	BCOMP		BA BSCH		BCOMP
Computing					BCOMP	
Computing & Information Science	CIS		BA BSC BAS			
Creative Writing	CW		BA			
Criminal Justice & Public Policy	CJPP	BA	BA BAS			
Crop, Horticulture and Turfgrass Sciences	CHAT	BSAG				
Ecology	ECOL	BSES	BSC BAS			BSES

Specialization Name	Specialization Acronym	Honours Program Major	Honours Program Minor	Honours Program Area of Emphasis	General Program	Co-op Program
Economic & Business Development	EBD			BAH.ID		
Economics	ECON	BA	BA BAS	BA BSCH		BA
Electricity & Systems	EAS			BSCH		
Energy & Mass Transfer	EMT			BSCH		
Engineering Systems & Computing	ESC	BENG				BENG
English	ENGL	BA	BA BAS		BA	
Environmental Biology	ENVB	BSC				
Environment & Development	EAD			BAH.ID		
Environmental Economics & Policy	EEP	BSES				
Environmental Engineering	ENVE	BENG	BENG			BENG
Environmental Geoscience & Geomatics	EGG	BSC				
Environmental Governance	EGOV	BA				
Environmental Management	EM	BBRM				
Environment and Resource Management	ERM	BSES				BSES
Environmental Sciences	ENVS	BSES				BSES
Equine Management	EQM	BBRM				
European Culture & Civilization	ECC		BA BAS	BAH.EURS		
European Business Studies	EBS			BAH.EURS		
European Studies	EURS	BA				
Family & Child Studies	FCS		BA BAS			
Finance	FIN			BCOMM.MEF		
Food and Agricultural Business	FAB	BCOMM				BCOMM
Food, Agricultural and Resource Economics	FARE	BA				
Food Engineering	FENG		BENG			
Food Science	FOOD	BSC				BSC
French Studies	FREN	BA	BA BAS		BA	
Gender and Development	GAD			BAH.ID		
GIS & Environmental Analysis	GIS		BSC BAS			
Geography	GEOG	BA	BA BAS		BA	
German	GERM		BA BAS			
Historical Perspectives in Development	HPD			BAH.ID		
History	HIST	BA	BA BAS		BA	
Hospitality and Tourism Management	HTM	BCOMM				BCOMM
Human Kinetics	HK	BSC				
Individual Studies	IS	BA				
Individualized	IN			BA BSCH		
International Development	ID	BA	BA BAS		BA	
Italian	ITAL		BA BAS			
Landscape Architecture		BLA				
Latin American Studies	LAS			BAH.ID		
Leadership and Organizational Management	LOM	BCOMM				
Marine & Freshwater Biology	MFB	BSC				
Management Economics & Finance	MEF	BCOMM				BCOMM
Marketing Management	MKMN	BCOMM				BCOMM



Specialization Name	Specialization Acronym	Honours Program Major	Honours Program Minor	Honours Program Area of Emphasis	General Program	Co-op Program
Marketing	MKTG		BA BAS			BCOMM
Mathematical Economics	MAEC	BA				BA
Mathematical Science	MSCI	BA BSC	BSC BAS	BA		
Mathematics	MATH		BA BSC BAS		BA	
Media & Cinema Studies	MCST		BA			
Microbiology	MICR	BSC	BAS BSC			BSC
Mechanical Engineering	MECH	BENG				BENG
Molecular Biology & Genetics	MBG	BSC	BSC BAS			
Museum Studies	MS		BA BAS			
Music	MUSC	BA	BA BAS		BA	
Nanoscience	NANO	BSC				BSC
Neuroscience	NEUR	BSC	BSC BAS			
Nutritional & Nutraceutical Sciences	NANS	BSC	BSC BAS			
Organic Agriculture	OAGR	BSAG				
Philosophy	PHIL	BA	BA BAS		BA	
Physical Science	PSCI	BSC			BSC	
Physics	PHYS	BSC	BSC BAS			BSC
Plant Biotechnology	PBTC			BSCH.PLSC		
Plant Environmental Science	PESC			BSCH.PLSC		
Plant Science	PLSC	BSC	BSC BAS			
Political Economy & Administrative Change	PEAC			BAH.ID		
Political Science	POLS	BA	BA BAS		BA	
Psychology	PSYC	BA	BA BAS		BA	BA
Public Management	PMGT	BCOMM				BCOMM
Real Estate & Housing	REH	BCOMM				BCOMM
Rural & Agricultural Development	RAD			BAH.ID		
Signal Processing	SP			BSCH		
Sociology	SOC	BA	BA BAS		BA	
Spanish and Hispanic Studies	SPAH	BA	BA BAS		BA	
Software Engineering	SENG	BCOMP				BCOMP
Statistics	STAT		BA BSC BAS	BA	BA	
Studio Art	SART	BA	BA			
Theatre Studies	THST	BA	BA BAS		BA	
Theoretical Physics	THPY	BSC				
Veterinary Medicine		DVM				
Water Resources Engineering	WRE	BENG				BENG
Wildlife Biology & Conservation	WBC	BSC				
Zoology	ZOO	BSC	BSC BAS			

## Bachelor of Applied Science (B.A.Sc.)

### Program Information

The University of Guelph offers an 8 semester (20.00 credits) honours program leading to a Bachelor of Applied Science (B.A.Sc.) degree. Students must select one of the 3 following major areas of study:

Adult Development (ADEV)

Applied Human Nutrition (AHN)

Child, Youth and Family (CYF)

Co-operative Education is available in the following programs:

Adult Development (Co-op) (ADEV:C)

Child, Youth and Family (Co-op) (CYF:C)

Elective offerings enable students to select courses which support or complement their primary field of study.

The program is interdisciplinary and provides a distinctive and integrated focus of applied social science in each of the 3 majors. Courses from the traditional disciplines in other departments in the University are coupled with courses offered by faculty members in the Department of Family Relations and Applied Nutrition whose own backgrounds reflect the interdisciplinary nature of the program.

Laboratory, practicum and field experiences enhance the students' opportunities to grasp the contributions of the social, physical and biological sciences to significant facets of human behaviour and experience, whether in family, community, or in educational settings.

### Academic Counselling

#### Program Counselling

A B.A.Sc. program counsellor is available to assist prospective students in the selection of their major and initial courses, and to respond to questions regarding any other aspects of their anticipated program. The program counsellor will also assist in-course students who need information or advice about their program or other academic regulations, who seek information on services and resources available to students or who are contemplating transfer into or out of their current major or degree program.

#### Academic Advising

On entering the program all students are assigned to a departmental advisor by major. Co-operative Education students in all majors are also assigned to an advisor. This advisor is thoroughly familiar with the academic requirements of the program and is also knowledgeable about career opportunities which relate to a student's specific major. Students are strongly encouraged to attend all meetings called by their departmental advisors, and to set up individual meetings with them when they have questions or concerns about their major, or their performance in the program.

#### Continuation of Study

Students are advised to consult the regulations for Continuation of Study which are outlined in detail in Section VIII--Undergraduate Degree Regulations & Procedures.

#### Conditions for Graduation

To qualify for the degree Bachelor of Applied Science, the student must satisfy the following conditions:

- the student must have successfully completed the schedule of studies requirements for the specified major
- the student must have a cumulative average of 60% or higher
- the student must have a term academic standing of Eligible to Continue

#### Schedule of Studies

Courses specified in the Schedule of Studies are required courses and must be completed successfully. A full course load normally includes 2.50 credits (normally 5 courses). The requirements for each major are set out below.

#### Special Expenses

Expenses for field trips can range from \$20 to \$30 per semester in the first 4 semesters and from \$25 to \$50 in each of the last 4 semesters. In certain courses modest expenses will be incurred for supplies and where appropriate for laboratory costs. According to recent Ontario legislation, agencies licensed by the Ministry of Community and Social Services which care for, or provide service to, children or vulnerable adults are required to do criminal reference checks on all their employees. Students enrolled in practica or field placement courses may be required to submit to the agency with which they are placed, personal information about any criminal convictions and pending criminal charges. The cost of acquiring this criminal reference check (Canadian Police Information Check) will be the responsibility of each student.

#### Adult Development (ADEV)

Department of Family Relations and Applied Nutrition, College of Social and Applied Human Sciences.

The Adult Development major focuses on health and well-being from young adulthood to old age within the context of changing family relationships and diverse social and cultural influences. Courses focus on current research and theory in adult development and aging, family relationships, human sexuality, social policy and community services. Field placements and community service learning opportunities enable students to gain knowledge, skills and values appropriate for work with individuals and groups in a variety of settings.

Graduates of this program are pursuing careers in a variety of settings including family and community service agencies; government policy-making, administration, and health promotion divisions; support services delivery for seniors and their families; health care agencies; employee and family assistance programs; and local social planning councils. This program provides a solid foundation for the pursuit of graduate studies in fields such as: family relations and human development, social work, human sexuality, gerontology, physical, occupational and recreation therapy programs, family law and mediation, couple and family therapy, education, health promotion, social policy and human resource management (business).

This interdisciplinary program is designed to provide students with an understanding of the influence of psychological, social, biological and economic factors on individual development, capabilities, health and relationships across the lifespan. It is one of several majors in the Department that share an over-arching goal of applying knowledge to promote individual and family well-being. This major offers a high degree of flexibility for students, who may choose to deepen their studies in one or more of the core content areas in the major (adulthood and aging, family and social relationships, human sexuality, or health and well-being) and/or to choose electives in a related or complementary field.

#### Program Requirements

All students in the Adult Development major must successfully complete a minimum of 20.00 credits, including the core of 10.50 required credits as outlined in the Schedule of Studies.

Some students may wish to select courses that provide a broad background appropriate for careers in teaching, social work, health promotion, couple and family relationships, physical, occupational and recreation therapy, nursing, business, public service management or other areas of work. Students interested in pursuing graduate education are encouraged to complete an undergraduate thesis in their senior year and to participate in faculty research projects.

In addition to the core requirements and options, there are courses in various departments throughout the University which may be taken as electives. Lists of suggested electives that relate to particular careers or areas of interest and requirements for admission to various graduate programs, including Faculties of Education, are available from the B.A.Sc. Program Counsellor.

Students must meet the continuation of study requirements at the time of graduation and have a minimum 60.00% cumulative average.

Students may take one minor in addition to the Adult Development major. See the University of Guelph Calendar, Section X, Degree Programs, Specialization and Their Degrees for list of minors : <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c10/index.shtml>. The 60.00% requirement applies to each major and minor.

#### Double Counting of Courses

A maximum of 50 percent of the courses applied to a minor may be courses taken in fulfillment of the major where required courses are the same.

#### Counselling on Minors

The B.A.Sc. program counsellor assists students in the selection of minors, interpreting program and academic regulations.

Academic departments offer the minors and assign faculty advisors to assist students with academic planning (e.g., a faculty advisor in the Psychology department handles queries about a minor in Psychology). Students should consult the appropriate faculty advisor, along with the B.A.Sc. Program Counsellor, when declaring a minor or requiring advice on the completion of specialization requirements. The list of faculty advisors is available on the Undergraduate Academic Information Centre website: [http://www.uoguelph.ca/uaic/students\\_faculty.shtml](http://www.uoguelph.ca/uaic/students_faculty.shtml) or contact the B.A.Sc. Program Counsellor for further information.

#### Major

##### Semester 1

FRHD*1100	[0.50]	Life: Health and Well-Being
NUTR*1010	[0.50]	Introduction to Nutrition
PSYC*1000	[0.50]	Introduction to Psychology
One of:		
ANTH*1150	[0.50]	Introduction to Anthropology
SOC*1100	[0.50]	Sociology
0.50 electives		

##### Semester 2

FRHD*1010	[0.50]	Human Development
FRHD*1020	[0.50]	Couple and Family Relationships
One of:		
BIOM*2000	[0.50]	Concepts in Human Physiology
MBG*1000	[0.50]	Genetics and Society

1.00 electives

**Semester 3**

FRHD*2060	[0.50]	Adult Development and Aging
FRHD*2100	[0.50]	Development of Human Sexuality
FRHD*3070	[0.50]	Research Methods: Family Studies
STAT*2080	[0.50]	Introductory Applied Statistics I

0.50 electives

**Semester 4**

FRHD*2350	[0.50]	Principles of Program Design in the Human Services
FRHD*3150	[0.50]	Strategies for Behaviour Change
STAT*2090	[0.50]	Introductory Applied Statistics II

1.00 electives

**Semester 5**

FRHD*3400	[0.50]	Communication and Counselling Skills
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2.00 electives

**Semester 6**

FRHD*3040	[0.50]	Parenting and Intergenerational Relationships
FRHD*3290	[1.00]	Practicum I: Adult Development

1.00 electives

**Note:** FRHD\*3290 may be taken in Semester 5 or Semester 6**Semester 7**

FRHD*4310	[0.50]	Professional Issues *
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2.00 electives

**Semester 8**

FRHD*4250	[0.50]	Aging and Health
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One of:

FRHD*4260	[0.50]	Social Policy and Gerontology
FRHD*4320	[0.50]	Social Policies for Children, Youth and Families

1.50 electives

**Electives - Recommended and Program Options**

Students planning to pursue graduate studies are encouraged to take FRHD\*4810 and FRHD\*4910 (undergraduate thesis courses). Students entering into human services after graduation are encouraged to take FRHD\*4290 (4th year practicum course). Students who intend to pursue studies or careers in the following areas, Adult Development and Aging, Family and Social Relations, Human Sexuality and Health or Research may wish to include electives from the following list:

**Adult Development and Aging Interest**

FRHD*3060	[0.50]	Principles of Social Gerontology
FRHD*4190	[0.50]	Assessment in Gerontology
FRHD*4290	[1.00]	Practicum II: Adult Development
NUTR*3150	[0.50]	Aging and Nutrition

**Family and Social Relations Interest**

FRHD*3090	[0.50]	Poverty and Health
FRHD*4020	[0.50]	Family Theory
FRHD*4290	[1.00]	Practicum II: Adult Development

**Human Sexuality and Health Interest**

FRHD*4200	[0.50]	Issues in Human Sexuality
FRHD*4290	[1.00]	Practicum II: Adult Development

**Research Interest**

FRHD*4810	[0.50]	Thesis I
FRHD*4910	[1.00]	Thesis II

**Graduate and Professional Studies**

Students have successfully used the B.A.Sc. degree to gain admission into graduate programs in human development/family science, couple and family therapy, social work, education, applied psychology, sociology, anthropology, occupational therapy, physiotherapy, speech and language, and social policy. If you plan to enter a graduate program after completing the Adult Development major of the B.A.Sc. degree program you will need to select certain courses as part of your undergraduate program to meet graduate program admission requirements. Sometimes these requirements are quite particular which means that you must plan your course selections early and carefully.

Although graduate programs differ in their entrance requirements, most graduate programs require that you have taken (at least): one course in research methods; two undergraduate statistics courses; and have completed an undergraduate thesis.

For many of the programs you will be required to take Graduate Record Exams (GREs) in the specific field of study. **You are strongly advised to contact the graduate programs that interest you early in your program to determine the specific entrance requirements of each program.**

**\* Exchange/Study Abroad Opportunities**

Students interested in study abroad experience could consider this in either Semester 5 or 7. If it is in Semester 5, then students could defer FRHD\*3400 to Winter Semester 6 with the Practicum FRHD\*3290 (with permission). If the study abroad experience is preferred in Semester 7, the Professional Issues course (FRHD\*4310) could be taken in Semester 5 (with permission).

**Adult Development (Co-op) (ADEV:C)****Department of Family Relations and Applied Nutrition, College of Social and Applied Human Sciences.**

The Adult Development Co-op major focuses on health and well-being from young adulthood to old age within the context of changing family relationships and diverse social and cultural influences. Courses focus on current research and theory in adult development and aging, family relationships, human sexuality, social policy and community services. Work placements and community service learning opportunities enable students to gain knowledge, skills and values appropriate for work with individuals and groups in a variety of settings.

Graduates of this program are pursuing careers in a variety of settings including family and community service agencies; government policy-making, administration, and health promotion divisions; support services delivery for seniors and their families; health care agencies; employee and family assistance programs; and local social planning councils. This program provides a solid foundation for the pursuit of graduate studies in fields such as: family relations and human development, social work, human sexuality, gerontology, physical, occupational and recreation therapy programs, family law and mediation, couple and family therapy, education, health promotion, social policy and human resource management (business).

This interdisciplinary program is designed to provide students with an understanding of the influence of psychological, social, biological and economic factors on individual development, capabilities, health and relationships across the lifespan. It is one of several majors in the Department that share an over-arching goal of applying knowledge to promote individual and family well-being. This major offers a high degree of flexibility for students, who may choose to deepen their studies in one or more of the core content areas in the major (adulthood and aging, family and social relationships, human sexuality, or health and well-being) and/or to choose electives in a related or complementary field.

**Program Requirements**

All students in the Adult Development Co-op major must successfully complete a minimum of 20.00 credits, including the core of 10.50 required credits as outlined in the Schedule of Studies. Students in the Co-op program must also complete COOP\*1100 in the third semester.

Some students may wish to select courses that provide a broad background appropriate for careers in teaching, social work, health promotion, couple and family relationships, physical, occupational and recreation therapy, nursing, business, public service management or other areas of work. Students interested in pursuing graduate education are encouraged to complete an undergraduate thesis in their senior year and to participate in faculty research projects.

In addition to the core requirements and options, there are courses in various departments throughout the University which may be taken as electives. Lists of suggested electives that relate to particular careers or areas of interest and requirements for admission to various graduate programs, including Faculties of Education, are available from the B.A.Sc. Program counsellor.

**Conditions for Graduation from the B.A.Sc. Co-operative Education Program**

Conditions for graduation are the same as the corresponding regular B.A.Sc. program. In addition, all work reports and work performance evaluations must have a grade of satisfactory or better.

**Major****Semester 1 - Fall**

FRHD*1100	[0.50]	Life: Health and Well-Being
NUTR*1010	[0.50]	Introduction to Nutrition
PSYC*1000	[0.50]	Introduction to Psychology

One of:

ANTH*1150	[0.50]	Introduction to Anthropology
SOC*1100	[0.50]	Sociology

0.50 electives

**Semester 2 - Winter**

FRHD*1010	[0.50]	Human Development
FRHD*1020	[0.50]	Couple and Family Relationships

One of:

BIOM*2000	[0.50]	Concepts in Human Physiology
MBG*1000	[0.50]	Genetics and Society

1.00 electives

**Semester 3 - Fall**

COOP*1100	[0.00]	Introduction to Co-operative Education
FRHD*2100	[0.50]	Development of Human Sexuality
FRHD*2060	[0.50]	Adult Development and Aging
FRHD*3070	[0.50]	Research Methods: Family Studies
FRHD*3400	[0.50]	Communication and Counselling Skills
STAT*2080	[0.50]	Introductory Applied Statistics I

**Semester 4 - Winter**

FRHD*3150	[0.50]	Strategies for Behaviour Change
FRHD*2350	[0.50]	Principles of Program Design in the Human Services

STAT\*2090 [0.50] Introductory Applied Statistics II  
1.00 electives

### Summer Semester

COOP\*1000 [0.00] Co-op Work Term I

### Fall Semester

COOP\*2000 [0.00] Co-op Work Term II

### Semester 5 - Winter

FRHD\*3040 [0.50] Parenting and Intergenerational Relationships

FRHD\*3290 [1.00] Practicum I: Adult Development

FRHD\*4250 [0.50] Aging and Health

One of:

FRHD\*4260 [0.50] Social Policy and Gerontology

FRHD\*4320 [0.50] Social Policies for Children, Youth and Families

### Semester 6 - Summer

2.50 electives

### Semester 7 - Fall

FRHD\*4310 [0.50] Professional Issues

2.00 electives

### Winter Semester

COOP\*3000 [0.00] Co-op Work Term III

### Semester 8 - Summer

2.50 electives

### Electives that Complement the Major

Students planning to pursue graduate studies are encouraged to take FRHD\*4810 and FRHD\*4910 (undergraduate thesis courses). Students entering into human services after graduation are encouraged to take FRHD\*4290 (4th year practicum course). Students who intend to pursue studies or careers in the following areas, Adult Development and Aging, Family and Social Relations, Human Sexuality and Health or Research may wish to include electives from the following lists:

FRHD\*3060 [0.50] Principles of Social Gerontology

FRHD\*4190 [0.50] Assessment in Gerontology

FRHD\*4290 [1.00] Practicum II: Adult Development

FRHD\*4020 [0.50] Family Theory

FRHD\*4810 [0.50] Thesis I

FRHD\*4910 [1.00] Thesis II

NUTR\*3150 [0.50] Aging and Nutrition

### Graduate and Professional Studies

Students have successfully used the B.A.Sc. degree to gain admission into graduate programs in human development/family science, couple and family therapy, social work, education, applied psychology, sociology, anthropology, physical, occupational and recreation therapy, speech and language, and social policy. If you plan to enter a graduate program after completing the Adult Development Co-op major of the B.A.Sc. degree program you will need to select certain courses as part of your undergraduate program to meet graduate program admission requirements. Sometimes these requirements are quite particular which means that you must plan your course selections early and carefully.

Although graduate programs differ in their entrance requirements, most graduate programs require that you have taken (at least): one course in research methods; two undergraduate statistics courses; and have completed an undergraduate thesis.

For many of the programs you will be required to take Graduate Record Exams (GREs) in the specific field of study. **You are strongly advised to contact the graduate programs that interest you early in your program to determine the specific entrance requirements of each program.**

### Applied Human Nutrition (AHN)

#### Department of Family Relations and Applied Nutrition, College of Social and Applied Human Sciences.

The Applied Human Nutrition major recognizes both the biological and the social facets of human nutrition. It focuses on nutrition from a preventive, maintenance and therapeutic perspective, all of which require a thorough understanding of the related biological sciences and of selected aspects of the behavioral sciences. Students learn about nutrition and its application to the maintenance of health and the prevention and treatment of disease. They also learn about individual and social behaviour, particularly in family settings, and the implications of behavioral factors in the establishment of good nutrition status from conception through to old age. Through the effective use of elective courses, the core requirements in the Major can be supplemented to create a program of study which will prepare graduates for a variety of health and education careers in the government or private sectors, or with the food industry. Others may proceed to graduate study in fields such as nutrition, public health nutrition, medicine or education.

An Area of Emphasis in Dietetics is also offered for those interested in becoming Registered Dietitians. Successful completion of the additional required and restricted elective courses will allow students to compete for a limited number of dietetic internship positions after graduation. Graduates who complete dietetic internships are eligible to write the Registration Examination and become Registered Dietitians, a regulated health profession. The Area of Emphasis in Dietetics is accredited by the Dietitians of Canada. Most graduates completing dietetic internships are employed in hospitals and other health care agencies such as community health centres and long-term care facilities where the credential of Registered Dietitian is required for practice. Some Registered Dietitians also find employment in a wide range of careers in health and education, and in the private sector. Still others proceed to graduate study in fields such as nutrition, public health nutrition, medicine or education.

### Program Requirements

Students in the Applied Human Nutrition Major must include the core of 12.50 required credits in the minimum of 20.00 credits. Students in the Area of Emphasis in Dietetics take an additional 2.50 required credits plus 1.50 restricted electives for 16.50 required credits in the minimum 20.00 credits. Discussion with a departmental advisor regarding the various choices possible from within the Major is strongly recommended. Students will normally register for courses according to the semesters indicated below for Fall and Winter sequencing.

Students taking the Area of Emphasis in Dietetics are strongly encouraged to seek help from departmental advisors to ensure they have selected all the required courses for eligibility to internships.

### Minors

Students may take one minor in addition to the Applied Human Nutrition Major. See the University of Guelph Calendar, Section X, Degree Programs, Specialization and Their Degrees for list of minors: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c10/index.shtml>.

### Counselling on Minors

The B.A.Sc. program counsellor assists students in the selection of minors, interpreting program and academic regulations. Academic departments offer the minors and assign faculty advisors to assist students with academic planning (e.g., a faculty advisor in the Psychology department handles queries about a minor in Psychology). Students should consult the appropriate faculty advisor, along with the B.A.Sc. Program Counsellor, when declaring a minor or requiring advice on the completion of specialization requirements. The list of faculty advisors is available on the Undergraduate Academic Information Centre website: [http://www.uoguelph.ca/uaic/students\\_faculty.shtml](http://www.uoguelph.ca/uaic/students_faculty.shtml) or contact the B.A.Sc. Program Counsellor for further information.

### Double Counting of Courses

A maximum of 50 percent of the courses applied to a minor may be courses taken in fulfillment of the major where required courses are the same.

### Major

#### Semester 1

CHEM\*1040 [0.50] General Chemistry I

FRHD\*1100 [0.50] Life: Health and Well-Being

PSYC\*1000 [0.50] Introduction to Psychology

One of:

HTM\*2700 [0.50] Understanding Foods

NUTR\*1010 [0.50] Introduction to Nutrition

0.50 electives

**Note:** HTM\*2700 is recommended for Semester 1 if capacity allows, but may also be taken in Semester 2 by choosing NUTR\*1010 in Semester 1

#### Semester 2

CHEM\*1050 [0.50] General Chemistry II

One of:

HTM\*2700 [0.50] Understanding Foods

NUTR\*1010 [0.50] Introduction to Nutrition

One of:

FRHD\*1020 [0.50] Couple and Family Relationships

SOC\*1100 [0.50] Sociology

1.00 electives

\*See note in Semester 1

#### Semester 3

BIOC\*2580 [0.50] Introduction to Biochemistry

HTM\*2030 [0.50] Control Systems in the Hospitality Industry

NUTR\*2050 [0.50] Nutrition Through the Life Cycle

STAT\*2080 [0.50] Introductory Applied Statistics I

0.50 electives

**Note:** HTM\*2030 may be taken in Semester 4.

**Note:** Students completing an Area of Emphasis in Dietetics must take one of:

CIS\*1200 [0.50] Introduction to Computing

MCS\*2020 [0.50] Information Management

**Semester 4**

MICR*2420	[0.50]	Introduction to Microbiology
NUTR*3210	[0.50]	Fundamentals of Nutrition
STAT*2090	[0.50]	Introductory Applied Statistics II

1.00 electives or restricted electives

**Semester 5**

BIOM*3200	[1.00]	Biomedical Physiology
FRHD*3070	[0.50]	Research Methods: Family Studies

1.00 electives or restricted electives

**Note:** Students completing an Area of Emphasis in Dietetics must take HTM\*3090. HTM\*3090 is recommended in Semester 5 in place of elective or restricted elective if capacity allows, but it may also be taken in Semester 6. If taken in Semester 6 take FRHD\*3400 and HROB\*2290 in Semester 5.

**Semester 6**

FRHD*3400	[0.50]	Communication and Counselling Skills
HROB*2290	[0.50]	Human Resources Management
NUTR*3070	[0.50]	Nutrition and Physical Activity Interventions
NUTR*3090	[1.00]	Clinical Nutrition I

**Semester 7**

NUTR*4010	[0.50]	Nutritional Assessment
NUTR*4070	[0.50]	Nutrition Education

1.50 electives or restricted electives

**Note:** Students completing an Area of Emphasis in Dietetics must take FRHD\*4310 and NUTR\*4040.

**Semester 8**

NUTR*4900	[0.50]	Selected Topics in Human Nutrition
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2.00 electives or restricted electives

Note: With approval from the instructor, students may substitute NUTR\*4810 and NUTR\*4910 for NUTR\*4900.

**Area of Emphasis in Dietetics Additional Courses Required**

Additional Courses Required (2.50 credits)

FRHD*4310	[0.50]	Professional Issues
HTM*3090	[1.00]	Restaurant Operations Management
NUTR*4040	[0.50]	Clinical Nutrition II

One of:

CIS*1200	[0.50]	Introduction to Computing
MCS*2020	[0.50]	Information Management

**Restricted Electives**

Students must take 1.50 restricted electives, including one 3000 level course, from the following list:

FOOD*2010	[0.50]	Principles of Food Science
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One of

FOOD*2400	[0.50]	Introduction to Food Chemistry
FOOD*3030	[0.50]	Food Chemistry I
FOOD*3050	[0.50]	Food Chemistry I

One of

FOOD*2410	[0.50]	Introduction to Food Processing
FOOD*3160	[0.75]	Food Processing I

One of

FOOD*2420	[0.50]	Introduction to Food Microbiology
FOOD*3230	[0.75]	Food Microbiology
FOOD*3240	[0.50]	Food Microbiology
FOOD*3430	[0.50]	Introduction to Food Analysis
FOOD*3700	[0.50]	Sensory Evaluation of Foods
HTM*2740	[0.50]	Cultural Aspects of Food
HTM*3780	[0.50]	Managing Food in Canada
NUTR*3110	[0.50]	Food Security
NUTR*3150	[0.50]	Aging and Nutrition

**Note:** Some of the restricted electives require prerequisites that are not included in the major.

**Child, Youth and Family (CYF)**

**Department of Family Relations and Applied Nutrition, College of Social and Applied Human Sciences.**

The Child, Youth and Family major, administered by the Department of Family Relations and Applied Nutrition, examines the psychological, social and physical conditions which influence the growth and development of children and adolescents. While the primary focus of the major is on children and youth, the program regards the family as a primary context of development and as the key to successful interventions for children with developmental, behavioural, or socio-emotional difficulties. Through the effective use of elective courses, the core requirements in the major can be supplemented to create a program of study which will prepare graduates for a variety of careers in child and youth services. Graduates are pursuing child and youth-related careers in a variety of settings including child and youth treatment facilities, elementary schools, paediatric wards in hospitals, family and community service agencies, and child care centres. Students interested in working with children ten years of age and younger may apply for membership in the College of Early Childhood Educators; see further details on required courses below. Further academic preparation may be required for certain careers. Many graduates go on to pursue graduate education in fields such as family studies, human development, psychology, counselling psychology, social work, speech pathology, and occupational therapy.

**Articulation Agreements**

The University of Guelph is a partner in several Articulation Agreements concerning the Child, Youth and Family major. Students who enter the B.A.Sc. Child, Youth and Family major with advanced standing through an articulation agreement should identify themselves to the B.A.Sc. Program Counsellor for specific guidance around their Schedule of Studies (see Section IV of this calendar).

Students in the Child, Youth and Family major who are interested in proceeding to teachers college should refer to Section IV--Admissions Information, Articulation Agreements for information about admission to the Bachelor of Education program at Nipissing University.

**Program Requirements**

All students in the Child, Youth and Family major must include the following core of 11.50 required credits and 0.50 restricted electives to a minimum of 20.00 credits. Students are encouraged to plan their use of electives carefully in order to focus their program on one or a combination of the career options open to graduates. Discussion with a faculty advisor regarding the various choices possible from within the major is strongly recommended. Students will normally register for courses according to the semesters indicated below for Fall and Winter sequencing. Students who register for Summer semesters and other students for whom the semester offerings present difficulty may, where they have the approval of their faculty advisor, take some courses in alternative semesters.

**Minors**

Students may take one minor in addition to the Child, Youth and Family major. See the University of Guelph Calendar, Section X, Degree Programs, Specialization and Their Degrees for list of minors : <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c10/index.shtml>. The 60.00% requirement applies to each major and minor.

**Double Counting of Courses**

A maximum of 50 percent of the courses applied to a minor may be courses taken in fulfillment of the major where required courses are the same.

**Counselling on Minors**

The B.A.Sc. program counsellor assists students in the selection of minors, interpreting program and academic regulations.

Academic departments offer the minors and assign faculty advisors to assist students with academic planning (e.g., a faculty advisor in the Psychology department handles queries about a minor in Psychology). Students should consult the appropriate faculty advisor, along with the B.A.Sc. Program Counsellor, when declaring a minor or requiring advice on the completion of specialization requirements. The list of faculty advisors is available on the Undergraduate Academic Information Centre website: [http://www.uoguelph.ca/uai/c/students\\_faculty.shtml](http://www.uoguelph.ca/uai/c/students_faculty.shtml) or contact the B.A.Sc. Program Counsellor for further information.

**Major****Semester 1**

FRHD*1100	[0.50]	Life: Health and Well-Being
NUTR*1010	[0.50]	Introduction to Nutrition
PSYC*1000	[0.50]	Introduction to Psychology

One of:

ANTH*1150	[0.50]	Introduction to Anthropology
SOC*1100	[0.50]	Sociology

0.50 electives

**Semester 2**

BIOM*2000	[0.50]	Concepts in Human Physiology
FRHD*1020	[0.50]	Couple and Family Relationships
MBG*1000	[0.50]	Genetics and Society

One of:

FRHD*2260	[0.50]	Infant Development
FRHD*2280	[0.50]	Adolescent Development

0.50 electives

**Semester 3**

FRHD*2100	[0.50]	Development of Human Sexuality
FRHD*2110	[0.50]	Exceptional Children and Youth
FRHD*3070	[0.50]	Research Methods: Family Studies
STAT*2080	[0.50]	Introductory Applied Statistics I
One of:		
FRHD*2060	[0.50]	Adult Development and Aging
FRHD*2270	[0.50]	Development in Early and Middle Childhood

**Semester 4**

FRHD*3150	[0.50]	Strategies for Behaviour Change
STAT*2090	[0.50]	Introductory Applied Statistics II
One of:		
FRHD*2040	[0.50]	Principles of Program Design for Children
FRHD*2300	[0.50]	Principles of Program Design for Youth

1.00 electives

**Semester 5**

FRHD*3180	[0.50]	Observation and Assessment Laboratory
FRHD*3400	[0.50]	Communication and Counselling Skills
One of:		
FRHD*3200	[1.00]	Practicum I: Child
FRHD*3250	[1.00]	Practicum I: Youth

0.50 electives

**Note:** FRHD\*3200 and FRHD\*3250 may be taken in Semester 6**Semester 6**

FRHD*3040	[0.50]	Parenting and Intergenerational Relationships
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2.00 electives

**Semester 7**

FRHD*4310	[0.50]	Professional Issues
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2.00 electives or restricted electives

**Semester 8**

FRHD*4320	[0.50]	Social Policies for Children, Youth and Families
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2.00 electives or restricted electives

**Restricted Electives**

In addition to the 11.50 required credits, 0.50 must be taken from the Department of Family Relations and Applied Nutrition at the 4000 level. (excluding FRHD\*4330 or FRHD\*4340).

**Electives - Recommended and Program Options****Child and Youth Services**

It is highly recommended that students planning to work in child and youth services complete the following Youth stream courses:

FRHD*2300	[0.50]	Principles of Program Design for Youth
FRHD*2270	[0.50]	Development in Early and Middle Childhood
FRHD*2280	[0.50]	Adolescent Development
FRHD*3250	[1.00]	Practicum I: Youth
FRHD*4340	[1.00]	Practicum II: Youth
FRHD*4400	[0.50]	Youth, Risk and Resilience

Students who intend to pursue a career in child and youth services may wish to choose electives from the following list:

EDRD*3120	[0.50]	Educational Communication
FRHD*3090	[0.50]	Poverty and Health
FRHD*3190	[0.50]	Administration of Programs for Children
FRHD*4020	[0.50]	Family Theory
FRHD*4200	[0.50]	Issues in Human Sexuality
FRHD*4810	[0.50]	Thesis I
FRHD*4910	[1.00]	Thesis II
NUTR*2050	[0.50]	Nutrition Through the Life Cycle
PSYC*3450	[0.50]	Social and Personality Development
PSYC*3850	[0.50]	Intellectual Disabilities
SOAN*2290	[0.50]	Identities and Cultural Diversity
SOC*1500	[0.50]	Crime and Criminal Justice
SOC*3040	[0.50]	Sociology of Social Welfare

**Early Childhood Education**

Students planning to apply for membership in the College of Early Childhood Educators (CECE) need to complete the following Child stream courses:

FRHD*2040	[0.50]	Principles of Program Design for Children
FRHD*2260	[0.50]	Infant Development
FRHD*2270	[0.50]	Development in Early and Middle Childhood
FRHD*3190	[0.50]	Administration of Programs for Children
FRHD*3200	[1.00]	Practicum I: Child
FRHD*4020	[0.50]	Family Theory
FRHD*4210	[0.50]	Senior Seminar in Early Education and Care
FRHD*4330	[1.00]	Practicum II: Child

Students who intend to pursue a career in early childhood education may wish to choose electives from the following list:

ENGL*2740	[0.50]	Children's Literature
FRHD*3090	[0.50]	Poverty and Health
FRHD*4810	[0.50]	Thesis I
FRHD*4910	[1.00]	Thesis II
NUTR*2050	[0.50]	Nutrition Through the Life Cycle
PSYC*3850	[0.50]	Intellectual Disabilities
SOAN*2290	[0.50]	Identities and Cultural Diversity

**Education - Primary / Junior / Intermediate**

Graduates interested in elementary school teaching need additional study at a Faculty of Education. For those who wish to teach primary (junior kindergarten to grade 3) or junior (grades 4 to 6), each faculty of education may have certain required courses for admission. Often recommended are courses in visual or performing arts, mathematics, languages, physical or natural sciences, history or geography. Students interested in intermediate (grades 7 to 10) level teaching need to acquire a teachable subject in a specific discipline. Normally, this requirement consists of six semester courses in an area of concentration. **Students are strongly advised to contact the Faculties of Education that interest them early in their programs to determine the specific requirements.**

**Graduate and Professional Studies**

Students have successfully used the B.A.Sc. degree to gain admission into graduate programs in social work, applied psychology, sociology, anthropology, occupational therapy, speech and language, and social policy. If you plan to enter a graduate program after completing the Child, Youth and Family major of the B.A.Sc. degree program you will need to select certain courses as part of your undergraduate program to meet graduate program admission requirements. Sometimes these requirements are quite particular which means that you must plan your course selections early and carefully. In our program you would include FRHD\*4810 and FRHD\*4910.

Although graduate programs differ in their entrance requirements, most graduate programs require that you have taken (at least): one course in research methods; two undergraduate statistics courses; and have completed an undergraduate thesis.

For many of the programs you will be required to take Graduate Record Exams (GREs) in the specific field of study. **You are strongly advised to contact the graduate programs that interest you early in your program to determine the specific entrance requirements of each program.**

**Child, Youth and Family (Co-op) (CYF:C)****Department of Family Relations and Applied Nutrition, College of Social and Applied Human Sciences.**

All students in the Child, Youth and Family Co-op major must include the following core of 11.50 required credits and 0.50 restricted electives to a minimum of 20.00 credits.

The first four semesters are as for the students in the regular program. Students in the co-op program must also complete COOP\*1100 in the third academic semester. Thereafter the schedule is as follows:

**Major****Semester 1**

FRHD*1100	[0.50]	Life: Health and Well-Being
NUTR*1010	[0.50]	Introduction to Nutrition
PSYC*1000	[0.50]	Introduction to Psychology

One of:

ANTH*1150	[0.50]	Introduction to Anthropology
SOC*1100	[0.50]	Sociology

0.50 electives

**Semester 2**

BIOM*2000	[0.50]	Concepts in Human Physiology
FRHD*1020	[0.50]	Couple and Family Relationships
MBG*1000	[0.50]	Genetics and Society

One of:

FRHD*2260	[0.50]	Infant Development
FRHD*2280	[0.50]	Adolescent Development

0.50 electives

**Semester 3**

COOP*1100	[0.00]	Introduction to Co-operative Education
FRHD*2100	[0.50]	Development of Human Sexuality
FRHD*2110	[0.50]	Exceptional Children and Youth
FRHD*3070	[0.50]	Research Methods: Family Studies
STAT*2080	[0.50]	Introductory Applied Statistics I

One of:

FRHD*2060	[0.50]	Adult Development and Aging
FRHD*2270	[0.50]	Development in Early and Middle Childhood

**Semester 4**

FRHD*3150	[0.50]	Strategies for Behaviour Change
FRHD*3400	[0.50]	Communication and Counselling Skills
STAT*2090	[0.50]	Introductory Applied Statistics II

One of:

FRHD*2040	[0.50]	Principles of Program Design for Children
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FRHD\*2300 [0.50] Principles of Program Design for Youth

0.50 electives

**Summer Semester**

COOP\*1000 [0.00] Co-op Work Term I

**Fall Semester**

COOP\*2000 [0.00] Co-op Work Term II

**Semester 5 - Winter**

FRHD\*3040 [0.50] Parenting and Intergenerational Relationships

FRHD\*4320 [0.50] Social Policies for Children, Youth and Families

One of:

FRHD\*3200 [1.00] Practicum I: Child

FRHD\*3250 [1.00] Practicum I: Youth

0.50 electives

**Semester 6 - Summer**

2.50 electives

**Semester 7 - Fall**

FRHD\*3180 [0.50] Observation and Assessment Laboratory

FRHD\*4310 [0.50] Professional Issues

1.50 electives or restricted electives

**Winter Semester**

COOP\*3000 [0.00] Co-op Work Term III

**Semester 8 - Summer**

2.50 electives

**Restricted Electives**

0.50 restricted electives from the Department of Family Relations and Applied Nutrition at the 4000 level (excluding FRHD\*4330 or FRHD\*4340).

## Bachelor of Arts (B.A.)

The University of Guelph offers general and honours programs leading to the B.A. degree. The General Program consists of a minimum of 15.00 credits requiring the equivalent of 6 semesters of successful full time study. The Honours Program consists of a minimum of 20.00 credits requiring the equivalent of 8 semesters of successful full time study. A student may register in Summer, Fall and Winter semesters. The normal course load is 2.50 credits per semester for a full time student on regular status. Students may register for 0.50 credit more at their own discretion. Part time study consists of 1.50 credits or fewer per semester.

### Program Information

**A student's selection of courses must follow the B.A. Program Regulations (including Distribution Requirements), a pattern of study for either the General or Honours degree (below), and the detailed schedule(s) of studies which follow for any special subject(s) studied.**

### Academic Counselling

#### Program Counselling

Students are urged to seek the assistance of the counsellors in the B.A. Counselling Office regarding their program and academic regulations, selecting courses, services and resources available on campus, and when they are experiencing difficulties that affect their academic progress.

#### Departmental Advising

Every academic department has advisors available to assist students in their course selection planning. Students should seek the advice of the faculty advisor when declaring a major, area of concentration, or minor, regarding course scheduling and completing the requirements for the specializations.

Students encountering difficulties within a course should first consult the instructor of the course. Co-operative education students in Economics and Psychology will also have a departmental Co-op Academic Advisor and Co-ordinator, and should consult Co-operative Education Services regarding scheduling work terms and the COOP\*1000 course.

### Academic Residence Requirements

1. At least 5.00 of the credits required for graduation by the student's program must be taken at the University of Guelph.
2. At least 60% of the 3000 and 4000 level courses required for graduation must be taken at the University of Guelph.

University of Guelph courses include courses taken on exchange and on study abroad programs. Letter of Permission courses are not included.

### Continuation of Study

Students are advised to consult the regulations for continuation of study within the program which are outlined in detail in Section VIII--Undergraduate Degree Regulations and Procedures of this calendar.

### Conditions for Graduation

In addition to meeting the general and honours degree requirements listed below under Program Regulations, students will not normally be eligible to graduate while on probationary or required-to-withdraw status.

### Distribution Requirements

The distribution requirements are designed to provide the student with exposure to and some understanding of a range of disciplines in the Arts, Social Sciences and Mathematical and Natural Sciences. Courses taken to satisfy the distribution requirements may also be counted toward a specialization in the general or honours program.

The B.A. Distribution Requirements (requirements 1, 2, and 3) need not be completed immediately but are a graduation requirement.

The distribution requirement of 8 courses (minimum 4.00 credits) is as follows:

1. A minimum of 1.50 credits over at least 2 different subject areas in the humanities:

- ARTH Art History
- CHIN Mandarin
- CLAS Classical Studies
- ENGL English
- EURO European Studies
- FREN French Studies
- GERM German Studies
- GREK Greek
- HIST History
- HUMN Humanities
- ITAL Italian Studies
- LAT Latin
- LING Linguistics
- MUSC Music

- PHIL Philosophy
- PORT Portuguese
- SART Studio Art
- SPAN Spanish and Hispanic Studies
- THST Theatre Studies

2. A minimum of 1.50 credits over at least two of the following subject areas in the social sciences:

- ANTH Anthropology
- ECON Economics
- GEOG Geography
- IDEV International Development
- ISS Interdisciplinary Social Science
- POLS Political Science
- PSYC Psychology
- SOAN Sociology and Anthropology
- SOC Sociology

3. 1.00 credits in natural and/or mathematical sciences from the list below.

### Natural and Mathematical Science Courses Acceptable for B.A. Distribution Requirements

Students must take 1.00 credits in natural and/or mathematical science courses to fulfill the B.A. science requirements. Students should choose their courses from the list below or any course for which those listed serve as prerequisites. Students are advised to fulfill this requirement before their final semester. Any problems related to this requirement should be discussed with a B.A. Program Counsellor.

Courses recommended for students with limited preparation (e.g., lacking 4U credit in a specific area):

AGR*2150	[0.50]	Plant Agriculture for International Development
BIOL*1020	[0.50]	Introduction to Biology
BIOL*1500	[0.50]	Humans in the Natural World
BIOM*2000	[0.50]	Concepts in Human Physiology
BOT*1200	[0.50]	Plants and Human Use
CHEM*1060	[0.50]	Introductory Chemistry
CHEM*1100	[0.50]	Chemistry Today
CIS*1000	[0.50]	Introduction to Computer Applications
ENVS*1060	[0.50]	Principles of Geology
ENVS*2060	[0.50]	Soil Science
ENVS*2130	[0.50]	Eating Sustainably in Ontario
ENVS*2210	[0.50]	Apiculture and Honey Bee Biology
ENVS*2270	[0.50]	Impacts of Climate Change
FOOD*2010	[0.50]	Principles of Food Science
GEOG*1300	[0.50]	Introduction to the Biophysical Environment
GEOG*1350	[0.50]	Earth: Hazards and Global Change
HORT*1120	[0.50]	Grape and Wine Science
HORT*1130	[0.50]	Science of Gardening
MBG*1000	[0.50]	Genetics and Society
MUSC*1090	[0.50]	Physics of Music
NUTR*1010	[0.50]	Introduction to Nutrition
PHYS*1600	[0.50]	Contemporary Astronomy
PHYS*1810	[0.50]	Physics of Music

Other acceptable courses which require 4U or university preparation:

BIOL*1XXX	[0.00]	Any BIOL course at the 1000 level
CHEM*1XXX	[0.00]	Any CHEM course at the 1000 level
CIS*1XXX	[0.00]	Any CIS course at the 1000 level
ENVS*2030	[0.50]	Meteorology and Climatology
ENVS*2250	[0.50]	Geology of Natural Disasters
MATH*1XXX	[0.00]	Any MATH course at the 1000 level
PHYS*1XXX	[0.00]	Any PHYS course at the 1000 level
STAT*2XXX	[0.00]	Any STAT course at the 2000 level

### Double Counting of Courses

A maximum of 50 percent of the courses in a second specialization may be courses taken in fulfillment of the first specialization where required courses are the same. (Specializations can include majors, minors, areas of concentrations and certificates.)

### Program Regulations

The General Degree Program provides the opportunity for a sound general education in the arts and social sciences, mathematics and sciences, while allowing for concentration of studies in one or more subjects.

The Honours Degree Program provides depth of study in one specialization, strengthening written and oral communication skills, research and analytical abilities, as well as ensuring a breadth of study in the arts, social sciences, mathematics and sciences.

### General Degree Requirements (BAG)

To graduate from a general program a student must:



1. earn 15.00 credits. These must include courses that fulfill the distribution requirements (see B.A. Distribution Requirements). At least 4.00 credits must be at the 3000 level or above. Not more than 6.00 credits at the introductory (1000) level may be counted towards the 15.00 credits requirement.
2. 9.00 of the required 15.00 credits must be in courses offered by the College of Arts, the departments of Economics, Geography, Political Science, Psychology, Sociology and Anthropology (in the College of Social and Applied Human Sciences and the College of Business and Economics), School of Computer Science, or the Department of Mathematics and Statistics.
3. no more than 11.00 credits in any one subject or discipline, as indicated by the course prefix code, can be counted towards a general degree.

While students are encouraged to complete the requirements of one or more areas of concentration, this is not a graduation requirement.

The requirements for each area of concentration are set out separately in the pages following the list of Honours and General Specializations Available in the B.A. Degree.

#### Honours Degree Requirements (BAH)

To graduate from an honours program a student must:

1. earn 20.00 credits. These must include courses that fulfill the distribution requirements (see B.A. Distribution Requirements), and courses that fulfill the requirements of at least 1 major. At least 7.00 credits must be at the 3000 level or above. Not more than 6.00 credits from courses at the introductory (1000) level may be counted towards the 20.00 credits requirement.
2. Honours B.A. students, except those completing a major in Food, Agricultural, and Resource Economics, must take a minimum of 12.00 credits in courses offered by the College of Arts or the departments of Economics, Geography, Political Science, Psychology, Sociology and Anthropology (in the College of Social and Applied Human Sciences and the College of Business and Economics), the School of Computer Science or the Department of Mathematics and Statistics.
3. no more than 14.00 credits in any one subject or discipline, as indicated by the course prefix code, can be counted towards an Honours Degree.
4. fulfill the course and credit requirements of at least one major with a cumulative average of at least 70% in all course attempts at the University of Guelph in that major. Grades in all courses in the discipline area of the major are included in the cumulative average. Grades from those courses in other disciplines listed as options toward the major are also included in the average. (This condition does not apply to majors in the interdisciplinary programs of International Development and European Studies, where only courses in the core and chosen area of emphasis will be counted toward the specialization average.) Students may take more than one major. They may also take one or more minors. The 70% requirement applies to each major and minor.

The requirements for each major and minor are set out separately in the pages following the list of Honours and General Specializations Available in the B.A. Degree.

University recognition that a student has graduated with a particular major or minor requires a cumulative average of 70% for all course attempts at this University in that major or minor.

Students failing to meet the graduation requirements of the Honours Program may apply to graduate with a General Degree if the requirements for the General Degree are met. Students should note that a specialization is not required to graduate with a General Degree.

#### Semester One Requirements

It is recommended that students select 1000 level courses as follows:

- Required courses for a chosen or intended specialization (major, minor, area of concentration).
- Electives (this could include arts/humanities, social sciences, natural/mathematical sciences, or electives from another area).

For more information on course selection, students can access the New Student Registration Handbook at: <https://www.uoguelph.ca/registrar/undergraduate/registrationhandbook/index>

#### Special Study Options

##### Study at Other Universities

Students contemplating study at another university for credit towards a Bachelor of Arts degree at the University of Guelph should refer to the general regulations governing Letters of Permission in Section VIII--Degree Regulations & Procedures in this calendar.

Students must obtain approval for the Letter of Permission prior to undertaking studies at another institution. Approval of the request depends on good standing in the program with a minimum average of 60%.

The normal limit of credits taken on a Letter of Permission is 2.50 based on Guelph credits.

Students with a specialization in languages who want to undertake a program of study in Quebec or abroad should consult the appropriate faculty advisor or the Director of the School of Languages and Literatures.

#### Study Abroad

The University of Guelph offers many other Study Abroad and Exchange opportunities for students to enrich their learning experience. Bachelor of Arts students are encouraged to participate in any of the diverse options available. Courses taken while on exchange or study abroad can be used as electives or core requirements. For further information on the programs available, please refer to Section V - International Study. Students are advised to meet with a B.A. Program Counsellor to discuss the feasibility of participating in an exchange or semester abroad.

#### Honours and General Specializations Available in the B.A. Degree General Program Areas of Concentration

Anthropology  
English  
French Studies  
Geography  
History  
International Development  
Mathematics  
Music  
Philosophy  
Political Science  
Psychology  
Sociology  
Spanish and Hispanic Studies  
Statistics  
Theatre Studies

**The schedule of studies for each area of concentration is given on the following pages under its subject heading.**

#### Honours Program Majors

Anthropology  
Art History  
Classical Studies  
Criminal Justice and Public Policy  
Economics\*  
English  
Environmental Governance  
European Studies  
Food, Agricultural and Resource Economics  
French Studies  
Geography  
History  
Individual Studies  
International Development  
Mathematical Economics\*  
Mathematical Science  
Music  
Philosophy  
Political Science  
Psychology\*  
Sociology  
Spanish and Hispanic Studies  
Studio Art  
Theatre Studies

**Subjects marked with an asterisk (\*) may be available as Co-operative Education programs. The schedule of studies for each major is given on the following pages under its subject heading.**

#### Honours Program Minors

Anthropology  
Art History  
Arts, Culture and Heritage Management  
Business  
Business Economics  
Classical Studies  
Computing and Information Science  
Creative Writing  
Criminal Justice and Public Policy  
Economics

English  
 European Culture and Civilization  
 Family and Child Studies  
 French Studies  
 Geography  
 German  
 History  
 International Development  
 Italian  
 Marketing  
 Mathematics  
 Media and Cinema Studies  
 Museum Studies  
 Music  
 Philosophy  
 Political Science  
 Psychology  
 Sociology  
 Statistics  
 Studio Art  
 Spanish and Hispanic Studies  
 Theatre Studies

The schedule of studies for each minor is given on the following pages under its subject heading.

### Anthropology (ANTH)

#### Department of Sociology and Anthropology, College of Social and Applied Human Sciences

The Department of Sociology and Anthropology offers three types of courses: sociology courses with the prefix SOC\*; anthropology courses with the prefix ANTH\*; and departmental courses with the prefix SOAN\*. The departmental category of courses recognizes the fact that the disciplines of sociology and sociocultural anthropology have developed in tandem and it is possible to identify large areas of overlap and convergence in the work of practitioners both historically and in the present. Departmental courses include most of the core theory and methods courses as well as many elective courses. They contribute equally to the subject matter of sociology as well as the subject matter of sociocultural anthropology for purposes of the undergraduate programs of study in both disciplines. Please see the listings for all courses required for the Anthropology program.

Courses will normally be offered in the semesters designated. Please check with the department for information about additional semester offerings. In addition to regularly scheduled courses, students may elect to do independent study. A student who wishes to do a reading course should first consult the professor with whom he/she wishes to work. Please note, a student is allowed a total of 1.00 credits only for reading courses.

#### Area of Concentration (General Program)

A minimum of 5.00 credits is required, including:

ANTH*1150	[0.50]	Introduction to Anthropology
ANTH*2160	[0.50]	Social Anthropology
ANTH*2230	[0.50]	Regional Ethnography
ANTH*3690	[0.50]	Engaging Anthropological Theory
ANTH*3770	[0.50]	Kinship, Family, and Power
SOAN*2120	[0.50]	Introductory Methods

One of:

MUSC*2270	[0.50]	World Music
PHIL*2100	[0.50]	Critical Thinking

1.00 additional credits in ANTH

0.50 additional credits in SOAN

Note: 1.00 credits of these additional credits must be completed at the 3000 level or above.

#### Major (Honours Program)

A minimum of 9.00 credits is required, including:

ANTH*1150	[0.50]	Introduction to Anthropology
ANTH*2160	[0.50]	Social Anthropology
ANTH*2230	[0.50]	Regional Ethnography
ANTH*3690	[0.50]	Engaging Anthropological Theory
ANTH*3770	[0.50]	Kinship, Family, and Power
ANTH*4700	[0.50]	Issues in Contemporary Anthropological Theory
SOAN*2120	[0.50]	Introductory Methods
SOAN*3070	[0.50]	Qualitative and Observational Methods

Two of:

LING*1000	[0.50]	Introduction to Linguistics
MUSC*2270	[0.50]	World Music
PHIL*2100	[0.50]	Critical Thinking

2.00 additional credits in ANTH

2.00 additional credits in SOAN

Note: 1.00 of these additional credits must be completed at the 4000 level.

Note: SOAN\*3120 is recommended, especially for students planning to enter graduate programs.

#### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

ANTH*1150	[0.50]	Introduction to Anthropology
ANTH*2160	[0.50]	Social Anthropology
ANTH*2230	[0.50]	Regional Ethnography
ANTH*3690	[0.50]	Engaging Anthropological Theory
ANTH*3770	[0.50]	Kinship, Family, and Power
SOAN*2120	[0.50]	Introductory Methods

One of:

MUSC*2270	[0.50]	World Music
PHIL*2100	[0.50]	Critical Thinking

1.00 additional credits in ANTH

0.50 additional credits in SOAN

Note: 1.00 of these additional credits must be completed at the 3000 level or above.

#### Art History (ARTH)

##### School of Fine Art and Music, College of Arts

The School provides for concentrated study in Art History or Studio Arts, or for a more balanced study combining the two disciplines. Both Studio Art and Art History degree programs require some work in both the programs. Many Art History courses are also open to non specialized students.

The Art History program covers historical perspectives on the visual arts, study of the methodologies of art history and critical theory, and consideration of contemporary issues in the practice and display of art. Students pursuing a Major or Minor in Art History are required to take a minimum number of courses at the 2000, 3000 and 4000 level.

Students majoring in other programs who are also interested in the study of Art History are encouraged to consider the Minor offered in Museum Studies. Specific requirements for the Art History Honours Major and Minor are listed below.

#### Student Counselling

The students who elect to take a substantial number of courses in Art History with the objective of graduate work are advised to obtain counselling from faculty regarding their choices. It is important to know that graduate studies in Art History will usually require a reading knowledge of at least 2 languages other than English. German, French, Italian and Latin are among the most useful choices. Cognate electives in other disciplines in the College of Arts (such as History) will almost certainly prove an asset.

#### Art History Core Requirements

All students are required to complete the following core courses [1.00 credits]:

ARTH*1510	[0.50]	Art Historical Studies I
ARTH*1520	[0.50]	Art Historical Studies II

#### Major (Honours Program)

A minimum of 9.00 credits is required, including:

ARTH*1510	[0.50]	Art Historical Studies I
ARTH*1520	[0.50]	Art Historical Studies II
ARTH*2220	[0.50]	The Visual Arts Today
ARTH*2480	[0.50]	Introduction to Art Theory and Criticism
ARTH*2540	[0.50]	Medieval Art
ARTH*2550	[0.50]	The Italian Renaissance
ARTH*2600	[0.50]	Early Modern Art

1.50 credits from:

ARTH*2050	[0.50]	Modern Latin American Art
ARTH*2060	[0.50]	Aboriginal Arts in the Americas
ARTH*2070	[0.50]	Art of the USA
ARTH*2120	[0.50]	Introduction to Museology
ARTH*2150	[0.50]	Art and Archaeology of Greece
ARTH*2280	[0.50]	Modern Architecture
ARTH*2290	[0.50]	History of Photographic Media
ARTH*2490	[0.50]	History of Canadian Art
ARTH*2580	[0.50]	Late Modern Art: 1900-1950
ARTH*2950	[0.50]	Baroque Art

2.00 credits from:

ARTH*3010	[0.50]	Contemporary Canadian Art
ARTH*3060	[0.50]	Public Art
ARTH*3150	[0.50]	Space: Roman Art and Urbanism
ARTH*3200	[0.50]	Colour: Practice & Meanings in Western Art
ARTH*3210	[0.50]	Critical Issues in Art History
ARTH*3220	[0.50]	Nationalism & Identity in Art
ARTH*3320	[0.50]	Lives: Aspects of Western Art
ARTH*3330	[0.50]	Display: Visual Culture in Western Europe
ARTH*3340	[0.50]	Studies in Renaissance and Baroque Art
ARTH*3520	[0.50]	Idea: Art Since 1950

ARTH*3600	[0.50]	Topics in the Long Eighteenth Century
ARTH*3620	[0.50]	Museum Studies
ARTH*3780	[0.50]	Gender and Art
2.00 credits from 4000-level seminar courses:		
ARTH*4310	[1.00]	Topics in Art & Visual Culture I
ARTH*4320	[1.00]	Topics in Art & Visual Culture II
ARTH*4330	[1.00]	Topics in Art & Visual Culture III
ARTH*4340	[1.00]	Topics in Art & Visual Culture IV
ARTH*4350	[1.00]	Topics in Art & Visual Culture V

Students may count either ARTH\*4600 "Individual Study: Art History" or ARTH\*4800 "Experiential Learning" towards their major. Neither of these courses meets the requirement of 2.00 credits from seminar courses.

### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

ARTH*1510	[0.50]	Art Historical Studies I
ARTH*1520	[0.50]	Art Historical Studies II

4.00 additional credits in Art History including at least 2.00 credits at the 3000 or 4000 level.

### Arts, Culture and Heritage Management (ACHM)

This minor prepares students for careers in the management of the artistic and cultural sectors. By examining arts, culture and heritage institutions, business models and consumer trends, students develop and demonstrate an understanding of the relationship between culture and society, cultural economies and the arts both globally and in the Canadian context. Attention is given to visual culture, film and theatre, sound/ music, heritage, management, law, marketing, communications and ethics. The experiential component allows students to gain practical experience in the field of their choice. The minor in Arts, Culture and Heritage Management guides students to an understanding of the pertinent questions at stake in today's entrepreneurial and diverse cultural environments.

### Minor (Honours Program)

A minimum of 5.00 credits is required including:

HUMN*1300	[0.50]	Fundamentals of Arts Management I
HUMN*2300	[0.50]	Fundamentals of Arts Management II
HROB*2010	[0.50]	Foundations of Leadership
MGMT*2150	[0.50]	Introduction to Canadian Business Management

**Note:** B.Comm students interested in this minor must substitute MGMT\*2150 with 0.50 additional credits from the Arts and Culture list below.

1.00 credit from Arts and Culture

ANTH*2660	[0.50]	Contemporary Native Peoples of Canada
ANTH*3650	[0.50]	Prehistory of Canadian Native Peoples
ARTH*2060	[0.50]	Aboriginal Arts in the Americas
ARTH*2120	[0.50]	Introduction to Museology
ARTH*2220	[0.50]	The Visual Arts Today
ARTH*2290	[0.50]	History of Photographic Media
ARTH*3010	[0.50]	Contemporary Canadian Art
ARTH*3060	[0.50]	Public Art
ARTH*3520	[0.50]	Idea: Art Since 1950
ARTH*3620	[0.50]	Museum Studies
ENGL*3380	[0.50]	Studies in the History of Literary Production
EURO*1100	[0.50]	European Cinema
FREN*3140	[0.50]	Women in Literature, Art and Film
FREN*3160	[0.50]	Songs, Lyrics and Poetry in French
HIST*3260	[0.50]	Cinema and the Moving Image
HIST*3450	[0.50]	The Uses of History
MUSC*2030	[0.50]	Music in Canada
MUSC*2150	[0.50]	Music and Popular Culture
MUSC*2270	[0.50]	World Music
SART*1150	[0.50]	Contemporary Artistic Practice
THST*2500	[0.50]	Contemporary Cinema
THST*3530	[0.50]	Canadian Cinema
THST*4240	[0.50]	Theatrical Organization and Culture
WMST*2000	[0.50]	Women and Representation

1.00 credit from Organizational Management

ACCT*1220	[0.50]	Introductory Financial Accounting
ACCT*2230	[0.50]	Management Accounting
EDRD*4120	[0.50]	Leadership Development in Small Organizations
HROB*2090	[0.50]	Individuals and Groups in Organizations
HROB*3010	[0.50]	Managing and Rewarding Performance
HROB*3050	[0.50]	Employment Law
HROB*3070	[0.50]	Attracting and Acquiring Talent
HROB*3090	[0.50]	Developing Talent
HROB*3100	[0.50]	Developing Management and Leadership Competencies
HROB*4060	[0.50]	Workforce Optimization
HTM*1700	[0.50]	Foodservice Management
HTM*2070	[0.50]	Event Management
MCS*1000	[0.50]	Introductory Marketing

MCS*2100	[0.50]	Personal Financial Management
MCS*3000	[0.50]	Advanced Marketing
0.50 additional credits from Ethics and Communication.		
EDRD*2020	[0.50]	Interpersonal Communication
EDRD*3140	[0.50]	Organizational Communication
EDRD*3160	[0.50]	International Communication
MGMT*3020	[0.50]	Corporate Social Responsibility
PHIL*2100	[0.50]	Critical Thinking
PHIL*2120	[0.50]	Ethics
PHIL*2600	[0.50]	Business and Professional Ethics

0.50 additional credits from Experiential Learning.

ARTH*4800	[0.50]	Experiential Learning
CLAS*3700	[0.50]	Experiential Learning and Language
EURO*3700	[0.50]	Experiential Learning and Language
FREN*3700	[0.50]	Experiential Learning and Language
GERM*3700	[0.50]	Experiential Learning and Language
HIST*3480	[0.50]	Workplace Learning
ITAL*3700	[0.50]	Experiential Learning and Language
SART*3800	[0.50]	Experiential Learning I
SPAN*3700	[0.50]	Experiential Learning and Language
THST*3000	[0.50]	Experiential Learning
THST*3010	[0.50]	Experiential Learning

**Note:** ANTH\*3950, ANTH\*4880, ASCI\*3700, ASCI\*4700, ASCI\*4710, HIST\*4470, HUMN\*3190, HUMN\*4190, MGMT\*4050, MUSC\*4200 can be counted toward the 0.50 credits in experiential learning if the proposed project is related to arts, culture and heritage management. Please consult the faculty advisor for the minor for details.

**At least 1.00 credits must be at 3000 level or higher.**

**Note:** Some courses may also have prerequisites, identified in course descriptions in the academic calendar.

### Business (BUS)

#### College of Business and Economics, Department of Management

The study of business is complementary to virtually any career or professional endeavour. The minor in Business is intended to enhance the business literacy of non-business students. Through a combination of core and elective courses, students from different disciplines will develop foundational knowledge and understanding of the core functional areas of business, and be invited to explore and apply this in relation to their primary area of study. **Note:** The minor in Business is not open to students enrolled in the Bachelor of Commerce program.

### Minor (Honours Program)

A minimum of 5.00 credits is required (all 3.00 required credits, plus 2.00 credits of restricted electives of which at least 1.00 credits must be at the 3000 level or above).

Required courses (3.00 credits):

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1050	[0.50]	Introductory Microeconomics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*1000	[0.50]	Introductory Marketing
MGMT*2150	[0.50]	Introduction to Canadian Business Management
MGMT*3020	[0.50]	Corporate Social Responsibility

Restricted Electives (2.00 credits of which at least 1.00 credits are at the 3000 level or above):

ACCT*2230	[0.50]	Management Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2200	[0.50]	Industrial Relations
ECON*2720	[0.50]	Business History
EDRD*3140	[0.50]	Organizational Communication
EDRD*3160	[0.50]	International Communication
EDRD*4120	[0.50]	Leadership Development in Small Organizations
ENGG*3240	[0.50]	Engineering Economics
ENGG*4050	[0.50]	Quality Control
ENGG*4070	[0.50]	Life Cycle Assessment for Sustainable Design
ENGG*4510	[0.50]	Assessment & Management of Risk
FARE*3030	[0.50]	The Firm and Markets
FARE*3310	[0.50]	Operations Management
FARE*4360	[0.50]	Marketing Research
FARE*4370	[0.50]	Food & Agri Marketing Management
HROB*2010	[0.50]	Foundations of Leadership
HROB*2290	[0.50]	Human Resources Management
HTM*3120	[0.50]	Service Operations Analysis
MCS*2020	[0.50]	Information Management
MCS*2100	[0.50]	Personal Financial Management
MCS*2600	[0.50]	Fundamentals of Consumer Behaviour
MCS*3000	[0.50]	Advanced Marketing
MCS*3040	[0.50]	Business and Consumer Law
MGMT*3320	[0.50]	Financial Management
MGMT*4050	[0.50]	Business Consulting

MGMT*4060	[0.50]	Business Consulting
PHIL*2600	[0.50]	Business and Professional Ethics
POLS*2250	[0.50]	Public Administration and Governance
POLS*3470	[0.50]	Business-Government Relations in Canada
PSYC*4330	[0.50]	Advanced Topics in I/O Psychology
SOAN*2040	[0.50]	Globalization of Work and Organizations

**Note:** not all restricted elective courses identified in this list will necessarily be open to all students in the Business minor. Some courses (noted by the \*asterisk\*) have priority access restrictions, or may be limited to students enrolled in the major from which the courses are drawn. In some cases a Course Waiver Request form signed by the instructor may be required in order for students to add these courses to their schedule. Please consult with the department offering the course about possible access. Some courses may also have prerequisites which are identified in course descriptions in the academic calendar.

### Business Economics (BECN)

#### Department of Economics and Finance, College of Business and Economics

Interdisciplinary study in Business Economics is offered as a minor in the honours program. Students in this program will be counselled by the Department of Economics and Finance. It is possible for students to pursue a more intensive program in the area of business and economics; see the heading Economics (ECON) or Mathematical Economics (MAEC) in the B.A. degree and the heading Management Economics (MEF) in the B.Comm. degree.

#### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

ACCT*1220	[0.50]	Introductory Financial Accounting
ACCT*2230	[0.50]	Management Accounting
ECON*1050	[0.50]	Introductory Microeconomics *
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2560	[0.50]	Theory of Finance

One of:

IPS*1500	[1.00]	Integrated Mathematics and Physics I
MATH*1030	[0.50]	Business Mathematics
MATH*1080	[0.50]	Elements of Calculus I
MATH*1200	[0.50]	Calculus I

One of:

ECON*2740	[0.50]	Economic Statistics
PSYC*1010	[0.50]	Making Sense of Data in Psychological Research
SOAN*2120	[0.50]	Introductory Methods
STAT*2040	[0.50]	Statistics I
STAT*2060	[0.50]	Statistics for Business Decisions
STAT*2080	[0.50]	Introductory Applied Statistics I
STAT*2120	[0.50]	Probability and Statistics for Engineers

One of:

ECON*3660	[0.50]	Economics of Equity Markets
ECON*4400	[0.50]	Economics of Organizations and Corporate Governance
ENGG*3240	[0.50]	Engineering Economics
FARE*3310	[0.50]	Operations Management
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*1000	[0.50]	Introductory Marketing
MCS*3040	[0.50]	Business and Consumer Law
MGMT*3320	[0.50]	Financial Management

\* FARE\*1040 and FARE\*1400 may replace this course if it is required for the major.

### Classical Studies (CLAS)

#### School of Languages and Literatures, College of Arts

The program in Classical Studies is intended particularly for students interested in Greek and Roman culture, society and history. The advanced study of both Greek and Latin is recommended to students who want a more precise understanding of the ancient cultures. Consult the Head of Classical Studies for detailed information.

#### Core Requirements

- CLAS\*1000, plus EITHER (GREK\*1100, GREK\*1110, GREK\*2020) OR (LAT\*1100, LAT\*1110, LAT\*2000)
- one of CLAS\*2000, CLAS\*2150, CLAS\*2350, CLAS\*3100
- one of CLAS\*3000, CLAS\*3010, CLAS\*3020
- one of CLAS\*3030, CLAS\*3040
- one of CLAS\*3150, HIST\*2850, PHIL\*2140

#### Major (Honours Program)

A minimum of 8.00 credits is required, including:

- the Classical Studies Core
- CLAS\*4000, CLAS\*4150, CLAS\*4400
- 2.50 additional credits in Classics, 1.00 of which may be taken from the following as part of the program:

d. ENGL*1410	[0.50]	Major Writers
HIST*2200	[0.50]	The Medieval World
HUMN*1030	[0.50]	What Makes a Literary Classic?
LING*1000	[0.50]	Introduction to Linguistics
PHIL*3060	[0.50]	Medieval Philosophy

#### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

- the Classical Studies Core
- two of CLAS\*4000, CLAS\*4150, CLAS\*4400

### Computing and Information Science (CIS)

#### School of Computer Science, College of Physical and Engineering Science

A knowledge of Computing is a complement to most areas of study. The Minor in Computing and Information Science is directed towards students who wish to supplement their studies in another area with some experience in Computing. Students interested in pursuing a Major in Computing can do so through the Bachelor of Computing Degree Program.

#### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

CIS*1500	[0.50]	Introduction to Programming
CIS*1910	[0.50]	Discrete Structures in Computing I
CIS*2170	[0.75]	User Interface Design
CIS*2430	[0.50]	Object Oriented Programming
CIS*2500	[0.50]	Intermediate Programming
CIS*2520	[0.50]	Data Structures
CIS*2750	[0.75]	Software Systems Development and Integration

0.50 additional credits from CIS courses at the 2000 level or above

0.50 additional credits from CIS courses at the 3000 level or above

#### Creative Writing (CW)

The Creative Writing minor reflects the significant role that creative writing plays in our cultural life, from travel writing and blogs, gaming and journalism, to poems, novels and films. The minor hones students' skills in expressive writing, and teaches students to situate their work within a broader context of local, global and historical creative texts. Workshops and a capstone seminar provide students with the opportunity to revise their work and develop a creative portfolio.

#### Minor (Honours Program)

A minimum of 5.00 credits is required including:

ENGL*1080	[0.50]	Literatures in English I: Reading the Past
ENGL*2920	[0.50]	Elements of Creative Writing
ENGL*4720	[1.00]	Creative Writing: Prose/Poetry

1.00 credit from the following:

ENGL*3050	[0.50]	Intermediate Fiction Writing Workshop
ENGL*3060	[0.50]	Intermediate Poetry Writing Workshop
ENGL*3070	[0.50]	Intermediate Screenwriting Workshop
ENGL*3090	[0.50]	Special Topics in Creative Writing Workshop
THST*2120	[0.50]	Writing for Performance

2.00 credits from the following:

CLAS*2000	[0.50]	Classical Mythology
CLAS*3030	[0.50]	Epic Heroes and Poems
ENGL*2040	[0.50]	Latina/o Literature and Cultural Production: Intro
ENGL*2080	[0.50]	Literatures in English II: Finding a Critical Voice
ENGL*2120	[0.50]	Seminar: Critical Practices
ENGL*2130	[0.50]	Seminar: Literature and Social Change
ENGL*2190	[0.50]	Representation and Sexuality
ENGL*2200	[0.50]	Postcolonial Literatures
ENGL*2230	[0.50]	Popular Genres
ENGL*2550	[0.50]	North American Native Literatures
ENGL*2640	[0.50]	Culture, Location, Identity: Minoritized Literatures in Canada and Beyond

ENGL*2740	[0.50]	Children's Literature
ENGL*2880	[0.50]	Women in Literature
ENGL*3040	[0.50]	U.S. Latina/o Literature
ENGL*3080	[0.50]	History of the English Language
ENGL*3380	[0.50]	Studies in the History of Literary Production
ENGL*3420	[0.50]	20th- & 21st-Century Drama
ENGL*3460	[0.50]	Literature in London
ENGL*3470	[0.50]	Twentieth-Century British Literature I
ENGL*3480	[0.50]	Twentieth-Century British Literature II
ENGL*3540	[0.50]	Writing the United States
ENGL*3550	[0.50]	Modern United States Literatures
ENGL*3560	[0.50]	Medieval Literature
ENGL*3670	[0.50]	Twentieth-Century Canadian Literature and Criticism
ENGL*3680	[0.50]	20th- & 21st-Century Canadian Literature and Criticism
ENGL*3750	[0.50]	Studies in Postcolonial Literatures

ENGL*3760	[0.50]	The Atlantic World
ENGL*3860	[0.50]	Topics in Literary and Cultural Studies
ENGL*3870	[0.50]	Topics in Literary and Cultural Studies
ENGL*3880	[0.50]	Topics in Literary and Cultural Studies
FREN*2020	[0.50]	France: Literature and Society
FREN*2060	[0.50]	Quebec: Literature and Society
FREN*3030	[0.50]	Good and Evil
FREN*3090	[0.50]	Classics of French Literature
FREN*3110	[0.50]	Storytelling in the Francophone World
FREN*3130	[0.50]	Representing the Self
FREN*3140	[0.50]	Women in Literature, Art and Film
FREN*3160	[0.50]	Songs, Lyrics and Poetry in French
FREN*3170	[0.50]	Fictions of Childhood
GERM*3020	[0.50]	Myth and Fairy Tales in Germany
GERM*3470	[0.50]	Holocaust & WWII in German Lit. & Film
HUMN*1030	[0.50]	What Makes a Literary Classic?
HUMN*3000	[0.50]	Narratives of Migration
HUMN*3020	[0.50]	Myth and Fairy Tales in Germany
HUMN*3400	[0.50]	Renaissance Lovers and Fools
ITAL*3400	[0.50]	Renaissance Lovers and Fools
SPAN*2990	[0.50]	Hispanic Literary Studies
SPAN*3220	[0.50]	Literature and Arts I: Spain Pre-1936
SPAN*3230	[0.50]	Literature and Arts II: Latin America Pre-1950

Students with a compelling reason to work in a genre other than prose or poetry at the 4000 level may substitute ENGL\*4810 and ENGL\*4910 for ENGL\*4720 with the faculty advisor's permission.

**Note:** Substituted courses may have their own prerequisites; check the course descriptions in the academic calendar.

### **Criminal Justice and Public Policy (CJPP)**

**Department of Sociology and Anthropology, and the Department of Political Science, College of Social and Applied Human Sciences**

Criminal Justice and Public Policy is offered as a minor in the honours program and as a major in the honours program. It is designed to provide students seeking a career in the criminal justice system, or planning to pursue an advanced degree with a knowledge base that will enable them to pursue their career objectives. The program offers a unique blend of sociological courses dealing with the criminal justice system as well as courses in Political Science dealing with public policy formation and implementation. It also provides students with the conceptual and methodological tools needed for further study.

Students who are not admitted directly into the CJPP major and subsequently wish to declare the specialization must apply directly to the department. In order to be eligible, applicants must have a cumulative average of 70% or better in the following foundation courses:

POLS*1400	[0.50]	Issues in Canadian Politics
POLS*2250 or POLS*2300		
POLS*2350	[0.50]	Law from a Political Science Perspective
SOAN*2120	[0.50]	Introductory Methods
SOC*1500	[0.50]	Crime and Criminal Justice
SOC*2700	[0.50]	Criminological Theory

Students wishing to declare the CJPP minor must also meet the above requirement.

Students from other institutions who transfer to the University of Guelph and wish to declare the CJPP major or minor must also meet the above requirement. If an external transfer student is granted credit for one or more of the foundation courses listed above, then he or she must attain a cumulative average of 70% or better in the remaining required CJPP foundation courses.

### **Major (Honours Program)**

A minimum of 9.00 credits is required, including:

PHIL*1010	[0.50]	Introductory Philosophy: Social and Political Issues
POLS*1400	[0.50]	Issues in Canadian Politics
POLS*2250 or POLS*2300		
POLS*2350	[0.50]	Law from a Political Science Perspective
SOAN*2120	[0.50]	Introductory Methods
SOC*1500	[0.50]	Crime and Criminal Justice
SOC*2700	[0.50]	Criminological Theory

0.50 credits from the following:

POLS*3650	[0.50]	Research Methods II: Quantitative Methods
SOAN*3120	[0.50]	Quantitative Methods

1.50 credits from the following:

SOC*2070	[0.50]	Social Deviance
SOC*2760	[0.50]	Homicide
SOC*3490	[0.50]	Law and Society
SOC*3710	[0.50]	Youth Justice
SOC*3730	[0.50]	Courts and Society
SOC*3740	[0.50]	Corrections and Penology
SOC*3750	[0.50]	Police in Society

1.50 credits from the following:

POLS*3130	[0.50]	Law, Politics and Judicial Process
POLS*3140	[0.50]	Politics and the Charter of Rights
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3250	[0.50]	Public Policy: Challenges and Prospects
POLS*3300	[0.50]	Governing Criminal Justice
POLS*3440	[0.50]	Corruption, Scandal and Political Ethics
POLS*3670	[0.50]	Comparative Public Policy and Administration

0.50 credits from the following:

HIST*3130	[0.50]	Popular Culture and Punishment, 1700-1900
PHIL*3040	[0.50]	Philosophy of Law
PHIL*3230	[0.50]	Theories of Justice
PSYC*3020	[0.50]	Psychology of Law

1.50 credits from the following:

POLS*4050	[1.00]	Advanced Topics in Law and Politics
POLS*4060	[0.50]	Advanced Topics Lecture in Law and Politics
POLS*4070	[1.00]	Courts and Parliament
POLS*4100	[1.00]	Women, Justice and Public Policy
POLS*4160	[1.00]	Multi-Level Governance in Canada
POLS*4250	[1.00]	Topics in Public Management
POLS*4260	[1.00]	Topics in Public Policy
POLS*4270	[0.50]	Advanced Lecture in Public Management
POLS*4280	[0.50]	Advanced Lecture in Public Policy
POLS*4310	[0.50]	Advanced Lecture in Women, Justice and Public Policy
POLS*4740	[1.00]	Advanced Topics in Rights and Liberties
POLS*4780	[0.50]	Advanced Lecture in Rights and Liberties
POLS*4970	[0.50]	Honours Political Science Research I
POLS*4980	[0.50]	Honours Political Science Research II
SOC*4010	[0.50]	Violence and Society
SOC*4030	[0.50]	Advanced Topics in Criminology
SOC*4200	[0.50]	Advanced Topics in Criminal Justice
SOC*4900	[0.50]	Honours Sociology Thesis I
SOC*4910	[0.50]	Honours Sociology Thesis II

### **Minor (Honours Program)**

A minimum of 5.00 credits is required, including:

PHIL*1010	[0.50]	Introductory Philosophy: Social and Political Issues
POLS*1400	[0.50]	Issues in Canadian Politics
POLS*2250 or POLS*2300		
POLS*2350	[0.50]	Law from a Political Science Perspective
SOAN*2120	[0.50]	Introductory Methods
SOC*1500	[0.50]	Crime and Criminal Justice
SOC*2700	[0.50]	Criminological Theory

1.50 credits from the following list, including 0.50 SOC and 0.50 POLS:

POLS*3130	[0.50]	Law, Politics and Judicial Process
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3300	[0.50]	Governing Criminal Justice
POLS*3250	[0.50]	Public Policy: Challenges and Prospects
POLS*3440	[0.50]	Corruption, Scandal and Political Ethics
POLS*3670	[0.50]	Comparative Public Policy and Administration
SOC*2070	[0.50]	Social Deviance
SOC*2760	[0.50]	Homicide
SOC*3490	[0.50]	Law and Society
SOC*3710	[0.50]	Youth Justice
SOC*3730	[0.50]	Courts and Society
SOC*3740	[0.50]	Corrections and Penology
SOC*3750	[0.50]	Police in Society

### **Economics (ECON)**

**Department of Economics and Finance, College of Business and Economics**

The Department of Economics and Finance offers courses in economic theory, applied economics and quantitative methods. Students may take courses leading to a B.A. in the honours. It is possible to combine Economics with various other disciplines such as mathematics and statistics, business administration, political science, geography and history. Students are urged to consult the department's program planning guide and the department's advisors for detailed information about courses and programs and about the course of study most appropriate as preparation for graduate work in economics or business administration, for professional degrees such as the Bachelor's degree in Law, and for careers in business and government.

### **Core Requirements**

ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2740	[0.50]	Economic Statistics

One of:

MATH*1030	[0.50]	Business Mathematics
MATH*1080	[0.50]	Elements of Calculus I

MATH\*1200 [0.50] Calculus I

### Major (Honours Program)

A minimum of 9.50 credits in Economics is required, including:

The Economics core requirements

ECON\*2770 [0.50] Introductory Mathematical Economics  
 ECON\*3710 [0.50] Advanced Microeconomics  
 ECON\*3740 [0.50] Introduction to Econometrics  
 ECON\*3810 [0.50] Advanced Macroeconomics  
 ECON\*4710 [0.50] Advanced Topics in Microeconomics  
 ECON\*4810 [0.50] Advanced Topics in Macroeconomics

One of:

ECON\*2720 [0.50] Business History  
 ECON\*3550 [0.50] North American Economic History  
 ECON\*3730 [0.50] The Origins of International Inequality  
 ECON\*4720 [0.50] Topics in Economic History

3.00 additional credits in Economics at the 3000 or 4000 level, at least 1.50 of which must be at the 4000 level

**Note:** Students contemplating graduate studies in Economics should take ECON\*4640, Applied Econometrics and ECON\*4840, Applied Econometrics II.

### Minor (Honours Program)

A minimum of 5.00 credits in Economics is required, including:

- the Economics core
- 2.00 other credits in Economics at the 3000 or 4000 level

**Notes:**

- ECON\*3740 is recommended.
- Students wishing to pursue a more structured Economics minor should take ECON\*3710 as well as ECON\*3740.
- ECON\*4800 may not be counted at the 4000 level for purposes of satisfying the minimum 4000 level credit requirements in the B.A. Honours Economics major. Only one of ECON\*4900 or ECON\*4910 may count in the B.A. program towards the minimum 4000 level requirement.

### Economics (Co-op) (ECON:C)

Department of Economics and Finance, College of Business and Economics

The Economics Co-op program provides an integrated academic/work experience for students with co-operating employer organizations. Students in the program complete 4-5 work terms while fulfilling the requirements of their honours Economics program.

All co-op students must complete the Economics core plus an introductory computer science course (CIS\*), ECON\*2770 and ECON\*3740 in their first 4 semesters. Admission in the co-op program is limited to students of high academic standing and will be considered only at semester 1 entry or at the end of semester 2. The first 2 work terms normally follow completion of the first 4 semesters of academic study. Students will only be permitted to take these work terms if they are eligible to continue in the Honours Economics program, have completed the required courses and are maintaining a satisfactory standing in their Economics program. The 3rd and 4th work terms will normally follow the 6th academic semester. For further information on the Economics Co-op program students are urged to consult the department's Program Guide and Co-operative Education Programs in Section X-degree Programs in this calendar.

Students should review the Economics section in the schedule of studies for additional program information.

### Major (Honours Program)

#### Semester 1

ECON\*1050 [0.50] Introductory Microeconomics

One of:

Math\*1000 0.50 Introductory Calculus  
 MATH\*1030 [0.50] Business Mathematics  
 MATH\*1080 [0.50] Elements of Calculus I  
 MATH\*1200 [0.50] Calculus I

1.50 electives

#### Semester 2 (Winter)

ECON\*1100 [0.50] Introductory Macroeconomics

One computer science course

1.50 electives

#### Summer Semester

Optional -- at the discretion of the student.

#### Semester 3 (Fall)

COOP\*1100 [0.00] Introduction to Co-operative Education  
 ECON\*2310 [0.50] Intermediate Microeconomics  
 ECON\*2410 [0.50] Intermediate Macroeconomics  
 ECON\*2740 [0.50] Economic Statistics  
 ECON\*2770 [0.50] Introductory Mathematical Economics

0.50 electives

#### Semester 4 (Winter)

ECON\*3740 [0.50] Introduction to Econometrics  
 One economic history course\*  
 1.50 electives

#### Summer Semester

COOP\*1000 [0.00] Co-op Work Term I

#### Fall Semester

COOP\*2000 [0.00] Co-op Work Term II

#### Semester 5 (Winter)

ECON\*3810 [0.50] Advanced Macroeconomics  
 1.00 credits in Economics at the 3000 level  
 1.00 electives

#### Summer Semester

COOP\*3000 [0.00] Co-op Work Term III

#### Semester 6 (Fall)

ECON\*3710 [0.50] Advanced Microeconomics  
 0.50 credits in Economics at the 4000 level (ECON\*4640 is recommended)  
 1.50 electives

#### Winter Semester

COOP\*4000 [0.00] Co-op Work Term IV

#### Summer Semester

COOP\*5000 [0.00] Co-op Work Term V

#### Semester 7 (Fall)

ECON\*4710 [0.50] Advanced Topics in Microeconomics  
 0.50 credits in Economics at the 4000 level  
 1.00 electives  
 0.50 restricted electives

#### Semester 8 (Winter)

ECON\*4810 [0.50] Advanced Topics in Macroeconomics  
 0.50 credits in Economics at the 4000 level  
 1.50 electives

\*the economic history course may be taken in any semester

### English (ENGL)

#### School of English and Theatre Studies, College of Arts

The School of English and Theatre Studies offers courses in the B.A. Program in English that focus on the study of literature and related texts across a broad range of theoretical, historical, and geographical sites. The School also welcomes non-majors into its courses at the 1000, 2000, and 3000 levels, suitable to other majors within the College of Arts and beyond. Certain courses in Theatre Studies (THST) and in Literature in Translation (CLAS, GERM, HUMN, SPAN) may be counted towards a degree in English. Consult the School of English and Theatre Studies for details.

First-year students registered in or considering one of the programs in English should register for ENGL\*1080 in the first semester and ENGL\*2080 in the second semester.

#### Area of Concentration (General Program)

A minimum of 5.00 English credits is required in the English core and the English electives. English elective courses must be chosen to fulfill the Distribution Requirements for the Area of Concentration.

**English core - 2.00 credits as follows:**

- ENGL\*1080, ENGL\*2080, core seminar (variable content), ENGL\*2120
- one additional core seminar (variable content): ENGL\*2130, ENGL\*3940, ENGL\*3960

English electives - 3.00 credits to include:

- 2.50 credits from 2000/3000 level lecture courses
- 0.50 credits from any other lecture or seminar course

#### Distribution Requirements for the Area of Concentration:

The electives and core seminars must be chosen to ensure that 0.50 credits are completed in each of the following three fields:

- Medieval and Early Modern Literature
- 18<sup>th</sup>-and 19<sup>th</sup> -century Literature
- 20<sup>th</sup>-and 21<sup>st</sup> -century Literature

Of these 1.50 credits, at least 0.50 must be in Canadian Literature.

**Note:** Please visit the School of English and Theatre Studies website: <http://www.uoguelph.ca/sets/> for a list of courses that fulfill these requirements. This list is updated every semester.

### Major (Honours Program)

A minimum of 8.50 English credits is required in the English core and the English electives. English elective courses must be chosen to fulfill the Distribution Requirements for the Major.

**English core - 3.00 credits as follows:**

1. ENGL\*1080, ENGL\*2080
2. four core seminars (variable content): ENGL\*2120, ENGL\*2130, ENGL\*3940, ENGL\*3960

English electives - 5.50 credits to include:

- 2.50 credits from 2000/3000 level lecture courses
- 1.00 credits from 4000 level courses
- 2.00 credits from any other lecture or seminar courses

#### Distribution Requirements for the Major:

The electives and core seminars must be chosen to ensure that 1.00 credits are completed in each of the following fields:

- Medieval and Early Modern Literature
- 18<sup>th</sup>-and 19<sup>th</sup> -century Literature
- 20<sup>th</sup>-and 21<sup>st</sup> -century Literature

Of these 3.00 credits, at least 0.50 credits must be in Canadian Literature.

A maximum of 2.00 credits at the 4000 level may be counted towards a major in English.

**Note:** Please visit the School of English and Theatre Studies website: <http://www.arts.uoguelph.ca/sets> for a list of courses that fulfill these requirements. This list is updated every semester.

#### Honours students interested in a more concentrated program or contemplating graduate work in English are strongly advised to:

- attain a good reading knowledge of another language, such as French
- take ENGL\*3380 (Studies in the History of Literary Production), ENGL\*3690 (History of Literary Criticism), ENGL\*4890 (Contemporary Literary Theory)
- take 2.00 credits from 4000-level seminars (2 seminars at 1.00 credits each)

The M.A. program in English at Guelph gives preference to qualified applicants with a broad experience in literary and cultural studies and related disciplines.

#### Minor (Honours Program)

The program of study and requirements are the same as for the Area of Concentration in the General Program.

### Environmental Governance (EGOV)

#### Department of Geography

Environmental governance refers to the processes through which societies make decisions that affect the environment. Governments have long been dominant players in this context. However, in Canada and around the world, the ability of governments alone to address environmental problems is being called into question. As a result, contemporary environmental governance increasingly involves citizens, non-government organizations, and businesses.

The Major in Environmental Governance introduces students to the challenges of environmental governance. Through completing courses from the disciplines of geography, political science, agricultural economics, and economics, students will receive: a solid foundation in the processes and mechanisms of environmental governance in Canada and elsewhere; an understanding of geographical, political, and economic factors that shape governance in Canada and around the world; and exposure to innovative approaches to environmental governance that address persistent and emerging societal concerns. Students completing the major will have the skills and experiences needed to participate effectively in environmental governance in a variety of settings. Hence, they will find careers in the public sector, in environmental non-government organizations, and, increasingly, in the private sector.

Completion of required courses, and careful selection from among optional courses, will facilitate students completing a minor in Geography, Political Science, or Economics. Minors in other programs also may complement the Major in Environmental Governance.

#### Major (Honours Program)

A minimum of 11.50 credits, consisting of 11.00 credits from the courses specified below, plus 0.50 credits from other 4000 level courses in Geography; Political Science; Food, Agricultural and Resource Economics (Agricultural Economics); or Economics:

ECON*1050	[0.50]	Introductory Microeconomics
EDRD*2650	[0.50]	Introduction to Planning and Environmental Law
GEOG*1220	[0.50]	Human Impact on the Environment
GEOG*1350	[0.50]	Earth: Hazards and Global Change
GEOG*2110	[0.50]	Climate and the Biophysical Environment
GEOG*2210	[0.50]	Environment and Resources
GEOG*3020	[0.50]	Global Environmental Change
GEOG*3210	[0.50]	Management of the Biophysical Environment
GEOG*4210	[0.50]	Environmental Governance
GEOG*4220	[0.50]	Local Environmental Management
GEOG*4230	[0.50]	Environmental Impact Assessment
MGMT*3020	[0.50]	Corporate Social Responsibility
POLS*1150	[0.50]	Understanding Politics
POLS*2250	[0.50]	Public Administration and Governance
POLS*3250	[0.50]	Public Policy: Challenges and Prospects
POLS*3370	[0.50]	Environmental Politics and Governance

One of:		
GEOG*2030	[0.50]	Environment and Development
GEOG*2230	[0.50]	Economic Geography
One of:		
ECON*2100	[0.50]	Economic Growth and Environmental Quality
FARE*2700	[0.50]	Survey of Natural Resource Economics
One of:		
HIST*2250	[0.50]	Environment and History
PHIL*2070	[0.50]	Philosophy of the Environment
SOC*3380	[0.50]	Society and Nature
One of:		
ECON*2740	[0.50]	Economic Statistics
GEOG*2460	[0.50]	Analysis in Geography
STAT*2040	[0.50]	Statistics I
One of:		
FARE*3170	[0.50]	Cost-Benefit Analysis
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3270	[0.50]	Local Government in Ontario
POLS*3470	[0.50]	Business-Government Relations in Canada
POLS*3790	[0.50]	The Political Economy of International Relations
One of:		
FARE*4290	[0.50]	Land Economics
FARE*4310	[0.50]	Resource Economics

At least 0.50 additional credits at the 4000 level from Geography; Political Science; Food, Agricultural and Resource Economics (FARE); or Economics. Students are advised to contact an Environmental Governance Faculty Advisor for a list of recommended 4000 level courses.

\* Note: Courses marked with an asterisk\* may require the completion of additional prerequisites not included in the requirements for the Environmental Governance major. Students should consult the most recent Undergraduate Calendar (Chapter XII – Course Descriptions) for specific prerequisites.

### European Culture and Civilization (ECC)

The minor in European Culture and Civilization is designed for students interested in the interdisciplinary study of European culture and history. It offers a combination of languages, history of European culture, literature, the arts, philosophy, history and political science.

**Note:** the minor is not open to European Studies majors.

#### Minor (Honours Program)

**Note:** some of the courses below (the language courses, some 3000 and 4000 level courses in lists A, B, C, D) have prerequisites not included in the minor.

A minimum of 5.00 credits, at least 1.00 of which must be at the 3000 level or above, is required, including:

1. EURO\*1100 [0.50] European Cinema
- EURO\*2200 [0.50] Towards European Modernism
- EURO\*3300 [0.50] Violence and Culture
2. 2.00 credits in one language chosen from the following list:
 

FREN*1200	[0.50]	French Language I
FREN*1300	[0.50]	French Language II
FREN*2020	[0.50]	France: Literature and Society
FREN*2500	[0.50]	French Translation I
FREN*2520	[0.50]	French Composition I
FREN*2550	[0.50]	Contemporary France
FREN*3090	[0.50]	Classics of French Literature
FREN*3500	[0.50]	French Translation II
FREN*3520	[0.50]	French Composition II
OR		
GERM*1100	[0.50]	Introductory German I
GERM*1110	[0.50]	Introductory German II
GERM*2010	[0.50]	Intermediate Language Practice
GERM*2490	[0.50]	Intermediate German
GERM*3150	[0.50]	Interactive German Language and Culture
OR		
HUMN*2020	[0.50]	The Criminal Mind in Italian Cinema
ITAL*1060	[0.50]	Introductory Italian I
ITAL*1070	[0.50]	Introductory Italian II
ITAL*2090	[0.50]	Intermediate Italian
ITAL*3400	[0.50]	Renaissance Lovers and Fools
ITAL*3700	[0.50]	Experiential Learning and Language
OR		
SPAN*1100	[0.50]	Introductory Spanish I
SPAN*1110	[0.50]	Introductory Spanish II
SPAN*2000	[0.50]	Intermediate Spanish I
SPAN*2010	[0.50]	Intermediate Spanish II
SPAN*2040	[0.50]	Culture of Spain
SPAN*2990	[0.50]	Hispanic Literary Studies

- SPAN\*3220 [0.50] Literature and Arts I: Spain Pre-1936  
 SPAN\*3500 [0.50] Advanced Spanish I
3. 1.50 credits; 0.50 credits from three of the following Groups A, B, C and D from the following list:

**Group A**

HIST*1010	[0.50]	The Early Modern World
HIST*2200	[0.50]	The Medieval World
HIST*2510	[0.50]	Modern Europe Since 1789
HIST*2820	[0.50]	Modern France Since 1750
HIST*3230	[0.50]	Spain and Portugal, 1085 to 1668
HIST*3350	[0.50]	Modern Germany
HIST*3540	[0.50]	World War II
HIST*3570	[0.50]	Women in Modern Europe
HIST*3750	[0.50]	The Reformation
HIST*3820	[0.50]	Early Modern France
HIST*4090	[1.00]	Modern European History
HIST*4470	[0.50]	Special History Project Seminar I
HIST*4580	[1.00]	The French Revolution

**Group B**

PHIL*2140	[0.50]	Ancient Greek Philosophy
PHIL*2160	[0.50]	Early Modern Philosophy: Reason vs. Experience
PHIL*3060	[0.50]	Medieval Philosophy
PHIL*3100	[0.50]	Kant and His Legacy
PHIL*3200	[0.50]	Continental Philosophy
PHIL*3360	[0.50]	Nineteenth Century Philosophy
POLS*2000	[0.50]	Political Theory
POLS*2100	[0.50]	Comparative Politics
POLS*2200	[0.50]	International Relations
POLS*3450	[0.50]	European Governments and Politics

**Group C**

CLAS*1000	[0.50]	Introduction to Classical Culture
CLAS*2000	[0.50]	Classical Mythology
CLAS*2350	[0.50]	The Classical Tradition
EURO*3000	[0.50]	Revolution and the Fantastic in European Culture
EURO*4050	[0.50]	Contemporary Europe. New Landscapes in the Post-Cold War Era
FREN*3030	[0.50]	Good and Evil
FREN*3110	[0.50]	Storytelling in the Francophone World
FREN*3140	[0.50]	Women in Literature, Art and Film
FREN*3160	[0.50]	Songs, Lyrics and Poetry in French
FREN*3170	[0.50]	Fictions of Childhood
HIST*2850	[0.50]	Ancient Greece and Rome
HUMN*1030	[0.50]	What Makes a Literary Classic?
HUMN*3000	[0.50]	Narratives of Migration
HUMN*3020	[0.50]	Myth and Fairy Tales in Germany
HUMN*3400	[0.50]	Renaissance Lovers and Fools
HUMN*3470	[0.50]	Holocaust & WWII in German Lit. & Film

**Note:** Other Spanish literature courses may be counted in this section provided the course-content is European-centered. Please see the ESP coordinator for further information.

**Group D**

ARTH*1510	[0.50]	Art Historical Studies I
ARTH*1520	[0.50]	Art Historical Studies II
ARTH*2550	[0.50]	The Italian Renaissance
ARTH*2580	[0.50]	Late Modern Art: 1900-1950
ARTH*2600	[0.50]	Early Modern Art
ARTH*3320	[0.50]	Lives: Aspects of Western Art
ARTH*3330	[0.50]	Display: Visual Culture in Western Europe
ARTH*3340	[0.50]	Studies in Renaissance and Baroque Art
MUSC*1060	[0.50]	Amadeus to Zeppelin: Music and Culture I
MUSC*2010	[0.50]	The Musical Avant-Garde

**Note:** other Music history courses may be counted if students with knowledge of music are granted waivers by instructor. The substitution(s) must also be approved by the ESP coordinator.

**European Studies (EURS)****Interdisciplinary Program**

The European Studies program is designed for students who seek a career in International Relations - especially in International Business and Administration - between Canada and Europe. It offers a combination of languages, specially designed courses in European thought, letters and history and specialization in either European Business or European Culture and Civilization.

Successful completion of the European Studies major requires proficiency in one of the following languages (French, German, Italian or Spanish). In order to demonstrate language proficiency, students have two options: they may study for a year at a European University, in the country where their chosen core language is spoken, or they may write a final research paper in the chosen core language within a required fourth year European Studies course (see EURO\*4740). It is highly recommended that students spend their third year studying at a European university, in the country where their chosen core language is spoken. The benefits of such an experience are considerable, both academically and personally. One specific academic outcome of a successful year abroad will be recognition that the student has fulfilled the program's core language requirement. For students who have spent one year studying at a European university in a country where their chosen core language is spoken, a course taken in that year involving a major academic paper or exam in the core language will, upon approval of the Co-ordinator of European Studies, be substituted for EURO\*4740. See the Coordinator for the European Studies program for more information. See also the course description for EURO\*4740.

**Major (Honours Program)**

A minimum of 12.00 credits is required, including:

5.00 credits in the three components of the European Studies core, 2.50 credits in one language, and 4.50 credits in either the European Culture and Civilization or the European Business Studies area of emphasis

**Core Requirements**

- |           |        |  |
|-----------|--------|--|
| EURO*1100 | [0.50] | European Cinema  |
| EURO*2200 | [0.50] | Towards European Modernism                                   |
| EURO*3000 | [0.50] | Revolution and the Fantastic in European Culture             |
| EURO*3300 | [0.50] | Violence and Culture   |
| EURO*4050 | [0.50] | Contemporary Europe. New Landscapes in the Post-Cold War Era |
| EURO*4740 | [0.50] | Research Project in European Studies                         |
| HIST*2510 | [0.50] | Modern Europe Since 1789                                     |
| HROB*2090 | [0.50] | Individuals and Groups in Organizations                      |
| POLS*2200 | [0.50] | International Relations                                      |
| POLS*3450 | [0.50] | European Governments and Politics                            |

**Note:** in order to demonstrate language proficiency, students must write a research paper (EURO\*4740) in their core language unless they have spent one year studying at a European university, in the country where their chosen core language is spoken. Where that is the case, a course taken in that year involving a major academic paper of exam in the core language will, upon approval of the Co-ordinator for European Studies, EURO\*4740.
2. 2.50 credits in one language:

FREN*1200	[0.50]	French Language I
FREN*1300	[0.50]	French Language II
FREN*2020	[0.50]	France: Literature and Society
FREN*2500	[0.50]	French Translation I
FREN*2520	[0.50]	French Composition I
FREN*2550	[0.50]	Contemporary France
FREN*3090	[0.50]	Classics of French Literature
FREN*3500	[0.50]	French Translation II
FREN*3520	[0.50]	French Composition II
OR		
GERM*1100	[0.50]	Introductory German I
GERM*1110	[0.50]	Introductory German II
GERM*2010	[0.50]	Intermediate Language Practice
GERM*2490	[0.50]	Intermediate German
GERM*3000	[0.50]	Narratives of Migration
GERM*3020	[0.50]	Myth and Fairy Tales in Germany
GERM*3150	[0.50]	Interactive German Language and Culture
GERM*3470	[0.50]	Holocaust & WWII in German Lit. & Film
OR		
HUMN*2020	[0.50]	The Criminal Mind in Italian Cinema
ITAL*1060	[0.50]	Introductory Italian I
ITAL*1070	[0.50]	Introductory Italian II
ITAL*2090	[0.50]	Intermediate Italian
ITAL*3700	[0.50]	Experiential Learning and Language
OR		
SPAN*1100	[0.50]	Introductory Spanish I
SPAN*1110	[0.50]	Introductory Spanish II
SPAN*2000	[0.50]	Intermediate Spanish I
SPAN*2010	[0.50]	Intermediate Spanish II
SPAN*2040	[0.50]	Culture of Spain
SPAN*2990	[0.50]	Hispanic Literary Studies
SPAN*3220	[0.50]	Literature and Arts I: Spain Pre-1936
SPAN*3500	[0.50]	Advanced Spanish I

**Areas of Emphasis****European Business**

Required courses:



ACCT*1220	[0.50]	Introductory Financial Accounting
ACCT*2230	[0.50]	Management Accounting
ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
MGMT*3320	[0.50]	Financial Management
MGMT*4000	[0.50]	Strategic Management

1.50 credits chosen from:

ECON*2200	[0.50]	Industrial Relations
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2560	[0.50]	Theory of Finance
ECON*3660	[0.50]	Economics of Equity Markets
ECON*3730	[0.50]	The Origins of International Inequality
FARE*3310	[0.50]	Operations Management
FARE*4370	[0.50]	Food & Agri Marketing Management
HROB*2290	[0.50]	Human Resources Management
HTM*1070	[0.50]	Responsible Tourism Policy and Planning
HTM*3030	[0.50]	Beverage Management
HTM*3160	[0.50]	Destination Management and Marketing
HTM*4050	[0.50]	Wine and Oenology
HTM*4170	[0.50]	International Tourism
MCS*1000	[0.50]	Introductory Marketing
MCS*2100	[0.50]	Personal Financial Management
MCS*2600	[0.50]	Fundamentals of Consumer Behaviour
MCS*3000	[0.50]	Advanced Marketing
MCS*3040	[0.50]	Business and Consumer Law
STAT*2060	[0.50]	Statistics for Business Decisions

### European Culture and Civilization

Students must take 4.50 credits including at least 0.50 credits from each of the following four groups. The remaining 2.50 credits may be chosen from any of the courses in the four groups.

#### Group A

HIST*1010	[0.50]	The Early Modern World
HIST*2200	[0.50]	The Medieval World
HIST*2510	[0.50]	Modern Europe Since 1789
HIST*2820	[0.50]	Modern France Since 1750
HIST*3230	[0.50]	Spain and Portugal, 1085 to 1668
HIST*3350	[0.50]	Modern Germany
HIST*3540	[0.50]	World War II
HIST*3570	[0.50]	Women in Modern Europe
HIST*3750	[0.50]	The Reformation
HIST*3820	[0.50]	Early Modern France
HIST*4090	[1.00]	Modern European History
HIST*4470	[0.50]	Special History Project Seminar I
HIST*4580	[1.00]	The French Revolution

#### Group B

PHIL*2140	[0.50]	Ancient Greek Philosophy
PHIL*2160	[0.50]	Early Modern Philosophy: Reason vs. Experience
PHIL*3060	[0.50]	Medieval Philosophy
PHIL*3100	[0.50]	Kant and His Legacy
PHIL*3200	[0.50]	Continental Philosophy
PHIL*3360	[0.50]	Nineteenth Century Philosophy
POLS*1400	[0.50]	Issues in Canadian Politics
POLS*1500	[0.50]	World Politics
POLS*2000	[0.50]	Political Theory
POLS*2100	[0.50]	Comparative Politics
POLS*3180	[0.50]	Research Methods I: Political Inquiry and Methods
POLS*3230	[0.50]	Modern Political Thought
POLS*3250	[0.50]	Public Policy: Challenges and Prospects
POLS*3370	[0.50]	Environmental Politics and Governance
POLS*3670	[0.50]	Comparative Public Policy and Administration
POLS*3790	[0.50]	The Political Economy of International Relations
POLS*4340	[1.00]	Nationalism, State-building and Identity

#### Group C

CLAS*1000	[0.50]	Introduction to Classical Culture
CLAS*2000	[0.50]	Classical Mythology
CLAS*2350	[0.50]	The Classical Tradition
FREN*3030	[0.50]	Good and Evil
FREN*3110	[0.50]	Storytelling in the Francophone World
FREN*3140	[0.50]	Women in Literature, Art and Film
FREN*3160	[0.50]	Songs, Lyrics and Poetry in French
FREN*3170	[0.50]	Fictions of Childhood
HIST*2850	[0.50]	Ancient Greece and Rome
HUMN*1030	[0.50]	What Makes a Literary Classic?
HUMN*3000	[0.50]	Narratives of Migration
HUMN*3020	[0.50]	Myth and Fairy Tales in Germany

HUMN*3400	[0.50]	Renaissance Lovers and Fools
HUMN*3470	[0.50]	Holocaust & WWII in German Lit. & Film

**Note:** Other Spanish and Hispanic literature courses may be counted in this section provided the course-content is European-centered. Please see the ESP coordinator for further information.

#### Group D

ARTH*1510	[0.50]	Art Historical Studies I
ARTH*1520	[0.50]	Art Historical Studies II
ARTH*2550	[0.50]	The Italian Renaissance
ARTH*2580	[0.50]	Late Modern Art: 1900-1950
ARTH*2600	[0.50]	Early Modern Art
ARTH*3320	[0.50]	Lives: Aspects of Western Art
ARTH*3330	[0.50]	Display: Visual Culture in Western Europe
ARTH*3340	[0.50]	Studies in Renaissance and Baroque Art
MUSC*1060	[0.50]	Amadeus to Zeppelin: Music and Culture I
MUSC*2010	[0.50]	The Musical Avant-Garde

**Note:** Other music history courses may be counted if students with knowledge of music are granted waivers by instructor. The substitution(s) must also be approved by the ESP coordinator.

#### Study Abroad

Year 3 or year 4 will provide students with the opportunity to continue their studies abroad. Students will select up to 6.00 credits which can be included in the area of emphasis, as electives, or both. They are subject to approval by the program coordinator and the departmental advisor. Courses taken in Europe will not count towards the specialization average.

#### Practicum Opportunity:

EURO\*3700 is available for those students wishing to participate in a practicum experience as part of the year abroad. The practicum must be a job or volunteer experience that contributes to the student's area of study and intended career. It must be approved in advance by the Coordinator. A final report, written in the student's chosen language, is a requirement of this course.

#### Family and Child Studies (FCS)

##### Department of Family Relations and Applied Nutrition, College of Social and Applied Human Sciences

Family and Child Studies is offered as a minor in the honours program. It is designed to provide students with an opportunity to pursue interdisciplinary studies which have a specific focus on human development over the life span and on the applied questions which relate to the needs of children and the functioning of families. Elective courses may be chosen to emphasize the family, the child, or a combination of the two. Students seeking counselling should consult with a faculty advisor in the Department of Family Relations and Applied Nutrition.

#### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

FRHD*1010	[0.50]	Human Development
FRHD*1020	[0.50]	Couple and Family Relationships
FRHD*2270	[0.50]	Development in Early and Middle Childhood
FRHD*3040	[0.50]	Parenting and Intergenerational Relationships
NUTR*1010	[0.50]	Introduction to Nutrition

A further 2.50 credits offered by the Department of Family Relations and Applied Nutrition (FRHD or NUTR\*2050), of which at least 1.00 must be at the 3000 level or above.

**Note:** where students are required to complete PSYC\*2450 for their program of study, FRHD\*2270 will not be required in the FCS minor, PSYC\*2450 will be substituted for FRHD\*2270.

#### Food, Agricultural and Resource Economics (FARE)

##### Department of Food, Agricultural and Resource Economics, Ontario Agricultural College

Food and Agriculture connect people with the world's natural resource base and are at the heart of global issues. In this major, students will acquire the analytical and management skills needed to develop the capacity to effectively deal with emerging issues and challenges, such as food, security and sustainability. Building on the understanding of economic theory and applied methods in both the Canadian and world context, a variety of job opportunities arise in industry, government agencies and non-governmental organizations.

Beyond the core offering, the major provides the flexibility for students to pursue thematic areas of study, as well as an opportunity to take additional liberal arts courses. In addition, this major provides excellent background for those students planning to undertake graduate work in food, agricultural or resource economics and other fields of applied economics.

#### Major (Honours Program)

A minimum of 11.00 credits, consisting of the 9.50 credits specified below plus 1.50 credits of restricted electives, is required, including:

ACCT*1220	[0.50]	Introductory Financial Accounting
AGR*1110	[1.00]	Introduction to the Agri-Food Systems

FARE*1300	[0.50]	Poverty, Food & Hunger
FARE*1400	[1.00]	Economics of the Agri-Food System
FARE*2410	[0.50]	Agri-food Markets and Policy
FARE*2700	[0.50]	Survey of Natural Resource Economics
FARE*3030	[0.50]	The Firm and Markets
FARE*4000	[0.50]	Agricultural and Food Policy
ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2740	[0.50]	Economic Statistics
ECON*2770	[0.50]	Introductory Mathematical Economics
ECON*3740	[0.50]	Introduction to Econometrics

One of:

FARE*3170	[0.50]	Cost-Benefit Analysis
FARE*4360	[0.50]	Marketing Research
FARE*4500	[0.50]	Decision Science

One of:

MATH*1030	[0.50]	Business Mathematics
MATH*1080	[0.50]	Elements of Calculus I
MATH*1200	[0.50]	Calculus I

1.50 additional credits, at least of which 0.50 credits must be at the 4000 level, chosen from the following list of thematic streams with the Food, Agricultural and Resource Economics specialization:

#### Food and Agribusiness Management:

FARE*4220	[0.50]	Advanced Agribusiness Management
FARE*4240	[0.50]	Futures and Options Markets
FARE*4370	[0.50]	Food & Agri Marketing Management
MGMT*3320	[0.50]	Financial Management

#### International Agricultural Development Economics:

ECON*2650	[0.50]	Introductory Development Economics
FARE*3250	[0.50]	Food and International Development
FARE*4210	[0.50]	World Agriculture, Food Security and Economic Development

#### Resource Economics:

ECON*4930	[0.50]	Environmental Economics
FARE*4290	[0.50]	Land Economics
FARE*4310	[0.50]	Resource Economics

**Notes:** A student may obtain permission to substitute certain other courses for the ones listed if the substitute courses fit with the students program. Approval from a departmental advisor is required.

Unless taken to satisfy the requirements of another program, no student may receive credit in this program for more than one of the following statistics prerequisites ECON\*2740, STAT\*2040, STAT\*2060, or STAT\*2080.

## French Studies (FREN)

### School of Languages and Literatures, College of Arts

All language courses carry 0.50 credits. Please note that students with Ontario Grade 12 credit or its equivalent in French are not normally admitted into FREN\*1090, FREN\*1100 or FREN\*1150. Francophone students usually start the program with second-year courses conditional upon approval by the Faculty Advisor. Students who are exempt from FREN\*1200 and/or FREN\*1300 will need to substitute higher level French course(s) in order to complete the required number of credits for their program. Under certain circumstances, 0.50 credits from other courses offered in the School of Languages and Literatures which contain material related to French Studies may be counted. Please see the faculty advisor for French Studies for more information. Students majoring in French are advised to take elective courses in another Romance language and in Latin.

It is also recommended that students include LING\*1000 among the electives in order to derive the maximum benefit from their studies. Except where stated otherwise, literary texts are, at all levels, studied in the original language. Students registering in French courses are expected to have the appropriate academic background.

#### Area of Concentration (General Program)

A minimum of 5.00 French credits taught in French is required, including:

FREN*1200	[0.50]	French Language I
FREN*1300	[0.50]	French Language II
FREN*2020	[0.50]	France: Literature and Society
FREN*2060	[0.50]	Quebec: Literature and Society
FREN*2520	[0.50]	French Composition I

2.50 additional credits in French

#### Major (Honours Program)

A minimum of 8.00 French credits taught in French is required, including:

FREN*1200	[0.50]	French Language I
FREN*1300	[0.50]	French Language II
FREN*2020	[0.50]	France: Literature and Society
FREN*2060	[0.50]	Quebec: Literature and Society
FREN*2520	[0.50]	French Composition I

at least 1.50 credits at the 4000 level

4.00 additional credits in French

#### Minor (Honours Program)

A minimum of 5.00 French credits taught in French is required, including:

FREN*1200	[0.50]	French Language I
FREN*1300	[0.50]	French Language II
FREN*2020	[0.50]	France: Literature and Society
FREN*2060	[0.50]	Quebec: Literature and Society
FREN*2520	[0.50]	French Composition I

2.50 additional credits in French

#### Notes:

1. Students are strongly urged to take at least 0.50 language credits each semester and they must plan to take a 4th year course in their 3rd year.
2. Students of French are encouraged to take advantage of the French residence on this campus. Applications for accommodation in the Maison Française should be made well in advance of registration.
3. FREN\*1090, FREN\*1100, FREN\*1150, are not counted toward a specialization in French.
4. Native speakers of French (or non-francophone equivalent) will not normally be admitted into FREN\*1200 and FREN\*1300. It is recommended they start their program with FREN\*2020, FREN\*2060, FREN\*2500, or FREN\*2520 with the approval of the Faculty Advisor.

#### Studies in Quebec or Abroad

The French program encourages students to spend 1 or 2 semesters in a French-speaking province or country, or to pursue their studies in an immersion program at the university level. A letter of permission is required (see Section VIII--Undergraduate Degree Regulations & Procedures). Students may also take advantage of federal-provincial programs such as the Explore program or the Ontario Rhone-Alps summer language course.

#### Year in Nice

A special year-long program in Nice, France, is offered to Guelph students at semester levels 5 and 6. All courses for which transfer credits have been arranged are credited at Guelph without the need for letters of permission; students pay only Guelph academic fees and are eligible for OSAP. For further information see the Head of French Studies.

## Geography (GEOG)

### Department of Geography, College of Social and Applied Human Sciences

The Department of Geography provides students with a broad range of courses in Human and Physical Geography which focus on the nature and evolution of the numerous and complex physical and human environment systems of the world. Students are required to select courses from both the human and physical fields. Within the program of studies it is possible for students through course selection to follow a particular line of interest in, for example, Rural Geography, Resource Management, Urban and Economic Geography, Biophysical Resources or Geomorphology.

The 1000 level courses provide a foundation for the Geography programs and are prerequisites or are strongly recommended for many of the 2000 level courses. The 2000 level systematic courses are prerequisite to the corresponding advanced courses at the 3000 and 4000 level. All students should obtain a copy of the department program planning guide and consult with faculty before planning their course of studies.

Students contemplating graduate or professional programs of study following completion of the honours program should consult a faculty advisor for advice on additional courses that they should take.

The department also offers a B.Sc. honours Earth Surface Science program (jointly with Land Resources Science), a B.Sc.(ENV.) honours Environmental Geography Major program, and a B.Sc. honours program Minor in Geographic Information Systems and Environmental Analysis which are described in the schedule of studies for each of the programs (Section X). Geography B.A. honours Majors are eligible to take the B.Sc. Minor. All Geography students are encouraged to consult with a faculty advisor regarding course selection.

The following courses may be counted as Geography credits: ENVS\*2030, ENVS\*2060, ENVS\*4220, GEOL\*2150, MET\*2030, SOIL\*2010.

#### Area of Concentration (General Program)

A minimum of 5.00 credits in Geography is required, including:

GEOG*1200	[0.50]	Society and Space
GEOG*1220	[0.50]	Human Impact on the Environment
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

Two of:

GEOG*2000	[0.50]	Geomorphology
GEOG*2110	[0.50]	Climate and the Biophysical Environment
GEOG*2210	[0.50]	Environment and Resources
GEOG*2230	[0.50]	Economic Geography
GEOG*2260	[0.50]	Applied Human Geography

One of:

GEOG*2460	[0.50]	Analysis in Geography
GEOG*2480	[0.50]	Mapping and GIS

2.00 credits at the 3000 level or above

### Major (Honours Program)

A minimum of 9.00 credits in Geography is required, including:

GEOG*1200	[0.50]	Society and Space
GEOG*1220	[0.50]	Human Impact on the Environment
GEOG*1300	[0.50]	Introduction to the Biophysical Environment
GEOG*2000	[0.50]	Geomorphology
GEOG*2110	[0.50]	Climate and the Biophysical Environment
GEOG*2210	[0.50]	Environment and Resources
GEOG*2230	[0.50]	Economic Geography
GEOG*2260	[0.50]	Applied Human Geography
GEOG*2460	[0.50]	Analysis in Geography
GEOG*2480	[0.50]	Mapping and GIS
GEOG*3480	[0.50]	GIS and Spatial Analysis
GEOG*4880	[0.50]	Contemporary Geographic Thought

3.00 additional credits in Geography at the 3000 level or above including at least 1.50 credits at the 4000 level.

### Minor (Honours Program)

A minimum of 5.00 credits in Geography is required, including:

Two of:

GEOG*1200	[0.50]	Society and Space
GEOG*1220	[0.50]	Human Impact on the Environment
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

Two of:

GEOG*2000	[0.50]	Geomorphology
GEOG*2110	[0.50]	Climate and the Biophysical Environment
GEOG*2210	[0.50]	Environment and Resources
GEOG*2230	[0.50]	Economic Geography

One of:

GEOG*2260	[0.50]	Applied Human Geography
GEOG*2460	[0.50]	Analysis in Geography
GEOG*2480	[0.50]	Mapping and GIS

2.50 credits in Geography at the 3000 or 4000 level, 0.50 of which must be at the 4000 level.

### German (GERM)

#### School of Languages and Literatures, College of Arts

All language courses carry 0.50 credits. Students with two years of high school German or equivalent may not be admitted into GERM\*1100. Students with 12U German credit or its equivalent may be admitted into GERM\*1110 only with the approval of the department. All language students are advised to include LING\*1000 among their electives in order to derive the maximum benefit from their studies. Except where stated otherwise, literary texts are, at all levels, studied in the original language. Students registering in these courses will be expected to have the appropriate knowledge.

#### Study Abroad

The School of Languages and Literatures encourages students in the German program to spend 1 or 2 semesters in a German speaking country to continue their studies at the University level. Credit for programs of study successfully completed may be applied towards the University of Guelph degree requirements. For more information, contact the [Centre for International Program](#) or the School of Languages and Literatures.

### Minor (Honours Program)

A minimum of 5.00 credits in German is required from the following courses:

GERM*1100	[0.50]	Introductory German I
GERM*1110	[0.50]	Introductory German II
GERM*2010	[0.50]	Intermediate Language Practice
GERM*2490	[0.50]	Intermediate German
GERM*3000	[0.50]	Narratives of Migration
GERM*3020	[0.50]	Myth and Fairy Tales in Germany
GERM*3150	[0.50]	Interactive German Language and Culture
GERM*3470	[0.50]	Holocaust & WWII in German Lit. & Film
GERM*3600	[0.50]	Directed Readings in German Studies
GERM*3700	[0.50]	Experiential Learning and Language
GERM*4940	[0.50]	Research Paper in German Studies

Upon passing both the German designation and its Humanities co-requisites, students may count HUMN\*3000, HUMN\*3020 and HUMN\*3470 toward the German minor.

Students may also count 0.50 credit toward the German minor from:

ARTH*2950	[0.50]	Baroque Art
HIST*3350	[0.50]	Modern Germany
HUMN*1030	[0.50]	What Makes a Literary Classic?
LING*1000	[0.50]	Introduction to Linguistics
PHIL*3100	[0.50]	Kant and His Legacy
PHIL*3360	[0.50]	Nineteenth Century Philosophy

Students enrolled in the German program must contact the School of Languages and Literatures for an up-to-date sequence of course offerings.

### History (HIST)

#### Department of History, College of Arts

Courses marked (H) are designed as honours courses. Students in a general program wishing to take these must obtain the permission of instructors concerned. All other courses may be taken by both general and honours students. Students wishing to take a 3000 level course must have pass standing in at least 5.00 credits in university courses.

Students wishing to take a 4000 level course must have pass standing in at least 10.00 university credits. Access to all 4000 level history courses is restricted to students in the B.A. Honours program with at least a 70% average in all history course attempts. Students should note the prerequisite requirements of upper level courses in planning their individual programs.

Students entering semester 1 are advised to choose from 1000 level courses. Second semester students wishing to take an advanced level History course should select that course from the History core.

### Core Requirements

HIST*1050	[0.50]	Invitation to History
HIST*2450	[0.50]	The Practising Historian

One of:

HIST*1010	[0.50]	The Early Modern World
HIST*1150	[0.50]	The Modern World
HIST*1250	[0.50]	Science and Technology in a Global Context

One of:

HIST*2100	[0.50]	Pre-Confederation Canada
HIST*2600	[0.50]	Post-Confederation Canada

While not required to do so, students are advised to take both HIST\*2100 and HIST\*2600.

0.50 credits from each of a) Pre-Modern and b) Global. Course lists available in the Department of History and at: <http://www.uoguelph.ca/history/>.

### Area of Concentration (General Program)

A minimum of 5.00 credits in History is required, including:

a.	HIST*1050	[0.50]	Invitation to History
	HIST*2450	[0.50]	The Practising Historian

b. One of:

HIST*1010	[0.50]	The Early Modern World
HIST*1150	[0.50]	The Modern World
HIST*1250	[0.50]	Science and Technology in a Global Context

c. at least 1.50 credits in History must be at the 3000 level (excluding HIST\*3470)

2.00 additional credits in History

**Note:** With the permission of the department, students may select as part of their program 0.50 credits outside the History Department such as ECON\*2420, ECON\*3730, EURO\*4050.

### Major (Honours Program)

A minimum of 8.50 credits in History courses is required, including:

HIST*1050	[0.50]	Invitation to History
HIST*2450	[0.50]	The Practising Historian

One of:

HIST*1010	[0.50]	The Early Modern World
HIST*1150	[0.50]	The Modern World
HIST*1250	[0.50]	Science and Technology in a Global Context

One of:

HIST*2100	[0.50]	Pre-Confederation Canada
HIST*2600	[0.50]	Post-Confederation Canada

While not required to do so, students are advised to take both HIST\*2100 and HIST\*2600.

0.50 credits from each of a) Pre-Modern and b) Global. Course lists available in the Department of History and at: <http://www.uoguelph.ca/history/>.

5.50 additional credits in History including 2.00 at the 4000 level

### Minor (Honours Program)

A minimum of 5.00 credits in History is required, including:

HIST*1050	[0.50]	Invitation to History
HIST*2450	[0.50]	The Practising Historian

One of:

HIST*1010	[0.50]	The Early Modern World
HIST*1150	[0.50]	The Modern World
HIST*1250	[0.50]	Science and Technology in a Global Context

One of:

HIST*2100	[0.50]	Pre-Confederation Canada
HIST*2600	[0.50]	Post-Confederation Canada

While not required to do so, students are advised to take both HIST\*2100 and HIST\*2600.

0.50 credits from each of a) Pre-Modern and b) Global. Course lists available in the Department of History and at: <http://www.uoguelph.ca/history/>.

2.00 additional credits in History including 1.00 at the 3000 or 4000 level

**Note:** Honours students in History may, with the permission of the department, take up to 1.00 credits from outside the department such as ECON\*2420, ECON\*3730, EURO\*4050.

Students considering graduate work are advised to take 2.00 - 3.00 additional upper level History credits perhaps including the Special History Project Seminar (HIST\*4470, HIST\*4970) and to acquire a reading knowledge of a foreign language.

Honours students must complete HIST\*2450 by the end of their third semester to be eligible for 3000 level History courses.

### Individual Studies (IS)

#### Interdisciplinary Program

**B.A. Counselling Office, Room 130, MacKinnon Building, Ext. 52140.**

Honours B.A. students have the option of doing an Individual Studies Major. Students in the Individual Studies Major have the opportunity to determine the goals and methods of their studies. Areas of study can include courses in any of the colleges and where the University of Guelph has faculty expertise to assist students. Students are encouraged to develop an interdisciplinary perspective, and to explore the methods of inquiry which provide depth of knowledge in a specific subject.

A student submitting a proposal for the Individual Studies Major must submit the complete proposal to the B.A. Program Counsellor before the third week of classes of semester four. The B.A. Program Committee will consider proposals once, and will approve, approve with revisions, or deny the proposal. Proposals cannot be resubmitted.

**Proposals will not be considered unless they articulate a detailed rationale for a coherent program of studies that is significantly different from any existing major and minor combination at the University of Guelph, and unless the proposal meets the following criteria:**

- minimum of 9.00 credits
- minimum of 4.00 credits at the 3000 level and above, including at least 1.00 credits at the 4000 level
- minimum of 1.00 credits in methods and/or theory
- maximum of 1.50 credits at the 1000 level
- a senior level Directed Readings or Special Project course must be completed. When appropriate, the Committee will identify a faculty member as the supervisor for a student's course of study.

A student wishing to submit a proposed program of studies for the Individual Studies Major must prepare a proposal that will include the following:

- a clear statement of theme or areas of study
- a clear statement of the contribution of the major to a post-graduation field of work or study
- a clearly set out rationale for inclusion of the specific courses and how they relate to or develop the theme or areas of study
- a list of required "core" courses and "restricted electives" following the above criteria. When proposing core and restricted elective credits, students should keep in mind the prerequisites for their desired 3000 and 4000 level courses

**Note:** Students undertaking the Individual Studies Major must fulfill the requirements of the B.A. Honours Program as set out in Section X. The B.A. Program Counsellor is the academic counsellor. The Individual Studies designation will appear on the student's transcript upon graduation, but the title or subject of the major will not.

### International Development (ID)

#### Interdisciplinary Program

**International Development Studies, College of Social and Applied Human Sciences**

The International Development program provides students with an opportunity to pursue interdisciplinary and comparative studies of long-term change and international inequality.

A broad coverage of the process of international development, from the perspectives of history and social science, forms the basis for more in-depth study on such topics as economic development, the environment, gender, agriculture and rural life, politics and administration, and the Latin American region.

The primary participating departments are Economics, Geography, Political Science, and Sociology and Anthropology.

#### Area of Concentration (General Program)

A minimum of 5.00 credits is required, including:

ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
IDEV*1000	[0.50]	Understanding Development and Global Inequalities
IDEV*2500	[0.50]	International Development Studies
POLS*2080	[0.50]	Development and Underdevelopment

2.50 credits from the following Restricted Elective list, as indicated below. A minimum of 0.50 credits must be taken from each group and at least 1.50 credits must be taken at

the 3000 level. Students are advised to check prerequisites for their desired upper level courses.

#### Geography

GEOG*2030	[0.50]	Environment and Development
GEOG*3020	[0.50]	Global Environmental Change
GEOG*3050	[0.50]	Development and the City
GEOG*3320	[0.50]	Food Systems: Issues in Security and Sustainability

#### Sociology/Anthropology

ANTH*3670	[0.50]	Indigenous Peoples: Global Context
SOAN*3240	[0.50]	Gender & Global Inequality I
SOAN*3250	[0.50]	Social Change in Latin America
SOAN*3680	[0.50]	Perspectives on Development

#### Economics or Food, Agricultural and Resource Economics

ECON*2100	[0.50]	Economic Growth and Environmental Quality
ECON*2650	[0.50]	Introductory Development Economics
ECON*3730	[0.50]	The Origins of International Inequality
FARE*1300	[0.50]	Poverty, Food & Hunger
FARE*3250	[0.50]	Food and International Development

#### Political Science and History

HIST*2340	[0.50]	Migrations in the Atlantic World, 1500-1850
HIST*2890	[0.50]	Early Islamic World
HIST*2910	[0.50]	Modern Asia
HIST*2920	[0.50]	Republican Latin America
HIST*3070	[0.50]	Modern India
HIST*3150	[0.50]	History and Culture of Mexico
HIST*3320	[0.50]	Modern China
HIST*3360	[0.50]	History and Culture of Brazil
HIST*3410	[0.50]	Pre-Colonial Africa
HIST*3580	[0.50]	Women's History in Asia
HIST*3590	[0.50]	Ancient & Medieval India
HIST*3830	[0.50]	Modern Middle East
HIST*3910	[0.50]	Africa Since 1800
POLS*3000	[0.50]	Politics of Africa
POLS*3060	[0.50]	Politics of the Middle East and North Africa
POLS*3080	[0.50]	Politics of Latin America
POLS*3160	[0.50]	Women and Politics in the Third World
POLS*3320	[0.50]	Politics of Aid & Development
POLS*3490	[0.50]	Conflict and Conflict Resolution
POLS*3670	[0.50]	Comparative Public Policy and Administration
POLS*3790	[0.50]	The Political Economy of International Relations
POLS*3890	[0.50]	Government and Politics of India

### Major (Honours Program)

A minimum of 12.50 credits is required, including:

- 2.50 credits in IDEV core course requirements
- 5.00 credits in additional core requirements
- 5.00 credits in one of seven areas of emphasis

Students must select an area of emphasis by the end of the 4th semester of university study.

International Development students are encouraged to acquire at least one additional modern language and to work or study abroad.

Students wishing to substitute courses in the major with independent study courses in ID (IDEV\*3200, IDEV\*4190, IDEV\*4200) or with courses taken abroad should consult with the International Development advisor.

To help with planning and course selection, International Development students are encouraged to consult the Course planning guide on the IDS website <http://www.ids.uoguelph.ca>.

#### 1. International Development core requirements (IDEV) – 2.50 credits

IDEV*1000	[0.50]	Understanding Development and Global Inequalities
IDEV*2500	[0.50]	International Development Studies
IDEV*4500	[1.00]	International Development Seminar

One of:

IDEV*3010	[0.50]	Case Studies in International Development
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0.50 credits from relevant semester abroad, exchange program or experience abroad for credit, as approved by International Development advisor.

#### 2. Additional core requirements – 5.00 credits

ANTH*1150	[0.50]	Introduction to Anthropology
ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2650	[0.50]	Introductory Development Economics
GEOG*2030	[0.50]	Environment and Development
GEOG*3050	[0.50]	Development and the City
POLS*2080	[0.50]	Development and Underdevelopment

One of:

HIST*2930	[0.50]	Women and Cultural Change
SOAN*2400	[0.50]	Introduction to Gender Systems

WMST*1000	[0.50]	Introduction to Women's Studies
WMST*2000	[0.50]	Women and Representation
One of:		
EDRD*4020	[0.50]	Rural Extension in Change and Development
FARE*1300	[0.50]	Poverty, Food & Hunger
FARE*3250	[0.50]	Food and International Development
SOC*2080	[0.50]	Rural Sociology
One of:		
POLS*3320	[0.50]	Politics of Aid & Development
POLS*3670	[0.50]	Comparative Public Policy and Administration
POLS*3790	[0.50]	The Political Economy of International Relations

### 3. Area of emphasis – 5.00 credits

Choose one of the following seven areas:

- Economic and Business Development
- Environment and Development
- Gender and Development
- Historical Perspectives in Development
- Latin American Studies
- Political Economy and Administrative Change
- Rural and Agricultural Development

### Areas of Emphasis

#### Economic and Business Development

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*2310	[0.50]	Intermediate Microeconomics *
ECON*2410	[0.50]	Intermediate Macroeconomics *
ECON*2740	[0.50]	Economic Statistics *

Two of:

ECON*4720	[0.50]	Topics in Economic History
ECON*4830	[0.50]	Economic Development
ECON*4880	[0.50]	Topics in International Economics
ECON*4890	[0.50]	History of Economic Thought
ECON*4900	[0.50]	Special Study in Economics
ECON*4930	[0.50]	Environmental Economics
FARE*4290	[0.50]	Land Economics
FARE*4310	[0.50]	Resource Economics

1.50 additional credits at the 2000 level or above in ECON or FARE, at least 0.50 being in ECON and at least 1.00 being at the 3000 level or above.

0.50 additional credits with a regional focus at the 2000 level or above in ANTH, GEOG, HIST, IDEV, ISS, POLS, SOAN or SOC. See the Course planning guide on <http://www.ids.uoguelph.ca/> for a list of appropriate courses.

\* Entry into ECON\*2310, ECON\*2410 and ECON\*2740 requires a 1000-level MATH course.

#### Environment and Development

GEOG*1220	[0.50]	Human Impact on the Environment
GEOG*1350	[0.50]	Earth: Hazards and Global Change
GEOG*2210	[0.50]	Environment and Resources
GEOG*2260	[0.50]	Applied Human Geography
GEOG*3210	[0.50]	Management of the Biophysical Environment

One of:

ECON*2100	[0.50]	Economic Growth and Environmental Quality
FARE*2700	[0.50]	Survey of Natural Resource Economics
HIST*2250	[0.50]	Environment and History
HIST*3460	[0.50]	Natural Disasters in Global History
PHIL*2070	[0.50]	Philosophy of the Environment
POLS*3370	[0.50]	Environmental Politics and Governance
SOC*2280	[0.50]	Society and Environment
SOC*3380	[0.50]	Society and Nature

Two of:

GEOG*2110	[0.50]	Climate and the Biophysical Environment
GEOG*2480	[0.50]	Mapping and GIS
GEOG*3020	[0.50]	Global Environmental Change
GEOG*3090	[0.50]	Gender and Environment
GEOG*3320	[0.50]	Food Systems: Issues in Security and Sustainability
GEOG*3490	[0.50]	Tourism and Environment
GEOG*3600	[0.50]	Geography of a Selected Region

Two of:

GEOG*3480	[0.50]	GIS and Spatial Analysis
GEOG*4200	[0.50]	Social Life of Cities
GEOG*4210	[0.50]	Environmental Governance
GEOG*4220	[0.50]	Local Environmental Management
GEOG*4230	[0.50]	Environmental Impact Assessment
GEOG*4390	[0.50]	Seminar in Rural Geography
GEOG*4480	[1.00]	Applied Geomatics

#### Gender and Development

ANTH*2160	[0.50]	Social Anthropology
SOAN*2120	[0.50]	Introductory Methods
SOAN*3240	[0.50]	Gender & Global Inequality I
SOAN*4230	[0.50]	Gender & Global Inequality II

One of the following not taken as part of the core:

ANTH*2230	[0.50]	Regional Ethnography
SOC*2080	[0.50]	Rural Sociology

One of:

SOAN*3070	[0.50]	Qualitative and Observational Methods
SOAN*3120	[0.50]	Quantitative Methods

One of:

ANTH*3400	[0.50]	The Anthropology of Gender
ANTH*3670	[0.50]	Indigenous Peoples: Global Context
ANTH*3690	[0.50]	Engaging Anthropological Theory
ANTH*3770	[0.50]	Kinship, Family, and Power
SOAN*3100	[0.50]	Gender Perspectives on Families and Households

Two of the following not taken as part of the core, at least 0.50 credits being at the 3000 level:

ENGL*2880	[0.50]	Women in Literature
GEOG*3090	[0.50]	Gender and Environment
HIST*2240	[0.50]	Women, War and Nation
HIST*2930	[0.50]	Women and Cultural Change
HIST*3020	[0.50]	Sexuality and Gender in History
HIST*3580	[0.50]	Women's History in Asia
PHIL*2060	[0.50]	Philosophy of Feminism I
POLS*2150	[0.50]	Gender and Politics
POLS*3160	[0.50]	Women and Politics in the Third World
POLS*3710	[0.50]	Politics and Sexuality
WMST*2000	[0.50]	Women and Representation

0.50 additional credits at the 4000 level in ANTH, SOAN, SOC.

#### Historical Perspectives in Development

HIST*1150	[0.50]	The Modern World
HIST*2450	[0.50]	The Practising Historian

One of:

HIST*1010	[0.50]	The Early Modern World
HIST*1050	[0.50]	Invitation to History
HIST*1250	[0.50]	Science and Technology in a Global Context

One of:

HIST*2240	[0.50]	Women, War and Nation
HIST*2070	[0.50]	World Religions
HIST*2250	[0.50]	Environment and History
HIST*2340	[0.50]	Migrations in the Atlantic World, 1500-1850
HIST*2500	[0.50]	Britain Since 1603
HIST*2890	[0.50]	Early Islamic World
HIST*2910	[0.50]	Modern Asia
HIST*2920	[0.50]	Republican Latin America

Three of the following not taken as part of the core:

ECON*2420	[0.50]	Canadian Economic History
ECON*3730	[0.50]	The Origins of International Inequality
HIST*3070	[0.50]	Modern India
HIST*3150	[0.50]	History and Culture of Mexico
HIST*3270	[0.50]	Revolution in the Modern World
HIST*3310	[0.50]	Disease and History
HIST*3320	[0.50]	Modern China
HIST*3360	[0.50]	History and Culture of Brazil
HIST*3380	[0.50]	British Imperialism in Asia and Africa
HIST*3410	[0.50]	Pre-Colonial Africa
HIST*3460	[0.50]	Natural Disasters in Global History
HIST*3470	[0.50]	Independent Reading
HIST*3580	[0.50]	Women's History in Asia
HIST*3590	[0.50]	Ancient & Medieval India
HIST*3830	[0.50]	Modern Middle East
HIST*3840	[0.50]	Ottoman Empire, 1300-1923
HIST*3910	[0.50]	Africa Since 1800

1.00 additional credits at the 4000-level in HIST.

0.50 additional credits with a regional focus at the 2000 level or above in ANTH, GEOG, IDEV, ISS, POLS, SOAN or SOC. See the Course planning guide on <http://www.ids.uoguelph.ca/> for a list of appropriate courses.

#### Latin American Studies

SPAN*2000	[0.50]	Intermediate Spanish I
SPAN*2010	[0.50]	Intermediate Spanish II
SPAN*3500	[0.50]	Advanced Spanish I

One of:

POLS*3180	[0.50]	Research Methods I: Political Inquiry and Methods
SOAN*2120	[0.50]	Introductory Methods

Three of:

SPAN*2990	[0.50]	Hispanic Literary Studies *
SPAN*3080	[0.50]	Spanish American Culture
HIST*2920	[0.50]	Republican Latin America
HIST*3150	[0.50]	History and Culture of Mexico
HIST*3360	[0.50]	History and Culture of Brazil
HUMN*3300	[0.50]	Latin American Studies in the Humanities
ISS*3300	[0.50]	Latin American Studies in the Social Sciences
POLS*3080	[0.50]	Politics of Latin America
SOAN*3250	[0.50]	Social Change in Latin America

0.50 additional credits in SPAN at the 3000 level\*

1.00 additional credits at the 4000 level in SPAN or in ANTH, HIST, IDEV, POLS, SOAN, SOC with a focus on Latin America or the Caribbean. See the Course planning guide on <http://www.ids.uoguelph.ca/> for a list of appropriate courses.

\*Note: SPAN\*2990 or permission of the instructor is required for 3<sup>rd</sup> year literature courses.

### Political Economy and Administrative Change

POLS*3180	[0.50]	Research Methods I: Political Inquiry and Methods
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Two of:

POLS*2000	[0.50]	Political Theory
POLS*2100	[0.50]	Comparative Politics
POLS*2200	[0.50]	International Relations

Two of the following not taken as part of the core:

ECON*2100	[0.50]	Economic Growth and Environmental Quality
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2720	[0.50]	Business History
ECON*3730	[0.50]	The Origins of International Inequality
ECON*4720	[0.50]	Topics in Economic History
ECON*4830	[0.50]	Economic Development
ECON*4890	[0.50]	History of Economic Thought
FARE*2700	[0.50]	Survey of Natural Resource Economics
FARE*3170	[0.50]	Cost-Benefit Analysis
FARE*3250	[0.50]	Food and International Development
FARE*4210	[0.50]	World Agriculture, Food Security and Economic Development
FARE*4290	[0.50]	Land Economics
FARE*4310	[0.50]	Resource Economics

1.00 additional credits in POLS at the 3000-level, not taken as part of the core.

1.00 additional credits in POLS at the 4000 level

0.50 additional credits with a regional focus at the 2000 or 3000 level in HIST or POLS. See the Course planning guide on <http://www.ids.uoguelph.ca/> for a list of appropriate courses.

### Rural and Agricultural Development

AGR*2150	[0.50]	Plant Agriculture for International Development
SOAN*2120	[0.50]	Introductory Methods

One of the following not taken as part of the core:

ANTH*2160	[0.50]	Social Anthropology
FARE*1300	[0.50]	Poverty, Food & Hunger
FARE*2700	[0.50]	Survey of Natural Resource Economics
SOC*2080	[0.50]	Rural Sociology

One of:

FARE*3170	[0.50]	Cost-Benefit Analysis
SOAN*3070	[0.50]	Qualitative and Observational Methods
SOAN*3120	[0.50]	Quantitative Methods

Two of the following not taken as part of the core:

ANTH*3670	[0.50]	Indigenous Peoples: Global Context
ANTH*3690	[0.50]	Engaging Anthropological Theory
FARE*3250	[0.50]	Food and International Development
GEOG*3320	[0.50]	Food Systems: Issues in Security and Sustainability
SOAN*3240	[0.50]	Gender & Global Inequality I
SOAN*3250	[0.50]	Social Change in Latin America
SOAN*3680	[0.50]	Perspectives on Development
SOC*3380	[0.50]	Society and Nature

Any EDRD courses at the 3000 level or above.

1.00 additional credits in AGR, BIOL, BOT, CROP, ENVS, HORT, NRS or OAGR, at least 0.50 being at the 3000-level or above. See the Course planning guide on <http://www.ids.uoguelph.ca/> for a list of appropriate courses.

1.00 additional credits in ANTH, FARE, SOAN or SOC at the 4000 level.

### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
IDEV*1000	[0.50]	Understanding Development and Global Inequalities
IDEV*2500	[0.50]	International Development Studies
POLS*2080	[0.50]	Development and Underdevelopment

2.50 credits from the following Restricted Elective list, as indicated below. A minimum of 0.50 credits must be taken from each group and at least 1.50 credits must be taken at the 3000 level. Students are advised to check prerequisites for their desired upper level courses.

Geography

GEOG*2030	[0.50]	Environment and Development
GEOG*3020	[0.50]	Global Environmental Change
GEOG*3050	[0.50]	Development and the City
GEOG*3320	[0.50]	Food Systems: Issues in Security and Sustainability

Sociology/Anthropology

ANTH*3670	[0.50]	Indigenous Peoples: Global Context
SOAN*3240	[0.50]	Gender & Global Inequality I
SOAN*3250	[0.50]	Social Change in Latin America
SOAN*3680	[0.50]	Perspectives on Development

Economics or Food, Agricultural and Resource Economics

ECON*2100	[0.50]	Economic Growth and Environmental Quality
ECON*2650	[0.50]	Introductory Development Economics
ECON*3730	[0.50]	The Origins of International Inequality
FARE*1300	[0.50]	Poverty, Food & Hunger
FARE*3250	[0.50]	Food and International Development

Political Science and History

HIST*2340	[0.50]	Migrations in the Atlantic World, 1500-1850
HIST*2890	[0.50]	Early Islamic World
HIST*2910	[0.50]	Modern Asia
HIST*2920	[0.50]	Republican Latin America
HIST*3070	[0.50]	Modern India
HIST*3150	[0.50]	History and Culture of Mexico
HIST*3320	[0.50]	Modern China
HIST*3360	[0.50]	History and Culture of Brazil
HIST*3410	[0.50]	Pre-Colonial Africa
HIST*3580	[0.50]	Women's History in Asia
HIST*3590	[0.50]	Ancient & Medieval India
HIST*3830	[0.50]	Modern Middle East
HIST*3910	[0.50]	Africa Since 1800
POLS*3000	[0.50]	Politics of Africa
POLS*3060	[0.50]	Politics of the Middle East and North Africa
POLS*3080	[0.50]	Politics of Latin America
POLS*3160	[0.50]	Women and Politics in the Third World
POLS*3320	[0.50]	Politics of Aid & Development
POLS*3490	[0.50]	Conflict and Conflict Resolution
POLS*3670	[0.50]	Comparative Public Policy and Administration
POLS*3790	[0.50]	The Political Economy of International Relations
POLS*3890	[0.50]	Government and Politics of India

### Italian (ITAL)

#### School of Languages and Literatures, College of Arts

All language courses carry 0.50 credits. Students with Year 4 or grade 12 Italian or their equivalent may be admitted into ITAL\*1060 or ITAL\*1070 only with the approval of the department. Students advancing in a Romance language (French, Spanish, Italian) are advised to take elective courses in a second Romance language and in Latin. All language students are strongly advised to include CLAS\*1000 and LING\*1000 among their electives in order to derive the maximum benefit from their studies. Except where stated otherwise, literary texts are, at all levels, studied in the original language. Students registering in these courses will be expected to have the appropriate knowledge.

#### Study Abroad

The School of Languages and Literatures encourages students in modern languages to spend 1 or 2 semesters in another country to study a particular language at the university level. Credit for programs of study successfully completed may be applied towards the University of Guelph degree requirements. Requests should be addressed well in advance to either the School or a particular section of the School. A letter of permission is required (see Section VIII--Undergraduate Degree Regulations and Procedures.)

Italian may be taken as a minor in the honours program. Students in Italian will be counselled by the School of Languages and Literatures.

#### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

HUMN*2020	[0.50]	The Criminal Mind in Italian Cinema
ITAL*1060	[0.50]	Introductory Italian I
ITAL*1070	[0.50]	Introductory Italian II
ITAL*2090	[0.50]	Intermediate Italian
ITAL*3060	[0.50]	Advanced Italian
ITAL*3400	[0.50]	Renaissance Lovers and Fools
ITAL*3700	[0.50]	Experiential Learning and Language
ITAL*4900	[0.50]	Research Project in Italian Studies

1.00 Credits from:

ARTH*2540	[0.50]	Medieval Art
ARTH*2550	[0.50]	The Italian Renaissance

ARTH*2950	[0.50]	Baroque Art
ARTH*3150	[0.50]	Space: Roman Art and Urbanism
ARTH*3320	[0.50]	Lives: Aspects of Western Art
ARTH*3340	[0.50]	Studies in Renaissance and Baroque Art
CLAS*1000	[0.50]	Introduction to Classical Culture
CLAS*2000	[0.50]	Classical Mythology
HIST*2200	[0.50]	The Medieval World
HIST*2850	[0.50]	Ancient Greece and Rome
HIST*3750	[0.50]	The Reformation
HUMN*1030	[0.50]	What Makes a Literary Classic?
HUMN*3000	[0.50]	Narratives of Migration
ITAL*4900	[0.50]	Research Project in Italian Studies
LAT*1100	[0.50]	Preliminary Latin I
LAT*1110	[0.50]	Preliminary Latin II
LAT*2000	[0.50]	Latin Literature
LING*1000	[0.50]	Introduction to Linguistics
PHIL*2140	[0.50]	Ancient Greek Philosophy
PHIL*3060	[0.50]	Medieval Philosophy

## Marketing (MKTG)

### Department of Marketing and Consumer Studies, College of Business and Economics

The minor in Marketing is designed for students who wish to better understand the subject of marketing and potentially integrate this with their primary field of study. The program develops a core knowledge of contemporary theory and principles of marketing and consumer behaviour of particular relevance to the non-specialist. Note: the minor in Marketing is not open to students enrolled in the Marketing Management major in the Bachelor of Commerce degree.

### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

ECON*1050	[0.50]	Introductory Microeconomics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*1000	[0.50]	Introductory Marketing
MCS*2600	[0.50]	Fundamentals of Consumer Behaviour
MCS*3000	[0.50]	Advanced Marketing
PSYC*1000	[0.50]	Introduction to Psychology

### Restricted Electives

2.00 restricted Electives:

ECON*2740	[0.50]	Economic Statistics
MCS*3010	[0.50]	Quality Management
MCS*3030	[0.50]	Research Methods
MCS*3500	[0.50]	Marketing Analytics
MCS*3600	[0.50]	Consumer Information Processes
MCS*3620	[0.50]	Marketing Communications
MCS*4040	[0.50]	Management in Product Development
MCS*4300	[0.50]	Marketing and Society
MCS*4400	[0.50]	Pricing Management
MCS*4600	[0.50]	International Marketing
PSYC*1010	[0.50]	Making Sense of Data in Psychological Research
STAT*2060	[0.50]	Statistics for Business Decisions

\*NOTE: only one of ECON\*2740, PSYC\*1010 or STAT\*2060 may be counted as a restricted elective towards the minor in Marketing.

### Mathematical Economics (MAEC)

Department of Economics and Finance, College of Business and Economics

Most economic theory rests on explicit, formal, mathematical and/or statistical foundations. This specialization articulates and emphasizes these interactions. It is most suitable for students who either have, or wish to develop, a strong analytical background.

### Major (Honours Program)

#### Semester 1

CIS*1500	[0.50]	Introduction to Programming
ECON*1050	[0.50]	Introductory Microeconomics
MATH*1200	[0.50]	Calculus I

1.00 electives

#### Semester 2

ECON*1100	[0.50]	Introductory Macroeconomics
MATH*1210	[0.50]	Calculus II

1.50 electives

#### Semester 3

ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2410	[0.50]	Intermediate Macroeconomics
STAT*2040	[0.50]	Statistics I

1.00 electives

#### Semester 4

ECON*3740	[0.50]	Introduction to Econometrics
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2.00 electives or restricted electives\*

#### Semester 5

ECON*3710	[0.50]	Advanced Microeconomics
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2.00 electives or restricted electives\*

#### Semester 6

ECON*3100	[0.50]	Game Theory
ECON*3810	[0.50]	Advanced Macroeconomics

1.50 electives or restricted electives\*

#### Semester 7

ECON*4640	[0.50]	Applied Econometrics I
ECON*4710	[0.50]	Advanced Topics in Microeconomics
ECON*4700	[0.50]	Advanced Mathematical Economics

1.00 electives or restricted electives\*

#### Semester 8

ECON*4810	[0.50]	Advanced Topics in Macroeconomics
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One of:

ECON*4840	[0.50]	Applied Econometrics II
MATH*3200	[0.50]	Real Analysis
STAT*4340	[0.50]	Statistical Inference
STAT*4350	[0.50]	Applied Multivariate Statistical Methods
STAT*4360	[0.50]	Applied Time Series Analysis

0.50 credits in Economics at the 4000 level

1.00 electives

\*at least 1.00 credits of the 4.00 restricted electives credits must be from Mathematics and 1.00 credits must be from Statistics. The remaining 2.00 credits can be from either subject area. Of the 4.00 credits, at least 1.00 credits must be at the 3000 level or above and the remaining 3.00 credits must be at the 2000 level or above.

**Note:** Courses from MATH or STATS will be allowed with the appropriate prerequisites, or by permission of the instructor.

### Mathematical Economics (Co-op) (MAEC:C)

Department of Economics and Finance, College of Business and Economics

Most economic theory rests on explicit, formal, mathematical and/or statistical foundations. This specialization articulates and emphasizes these interactions. It is most suitable for students who either have, or wish to develop, a strong analytical background.

### Major (Honours Program)

#### Semester 1 - Fall

CIS*1500	[0.50]	Introduction to Programming
ECON*1050	[0.50]	Introductory Microeconomics
MATH*1200	[0.50]	Calculus I

1.00 electives

#### Semester 2 - Winter

ECON*1100	[0.50]	Introductory Macroeconomics
MATH*1210	[0.50]	Calculus II

1.50 electives

#### Semester 3 - Fall

COOP*1100	[0.00]	Introduction to Co-operative Education
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2410	[0.50]	Intermediate Macroeconomics
STAT*2040	[0.50]	Statistics I

1.00 electives

#### Semester 4 - Winter

ECON*3740	[0.50]	Introduction to Econometrics
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2.00 electives or restricted electives\*

#### Spring/Summer

COOP*1000	[0.00]	Co-op Work Term I
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#### Fall

COOP*2000	[0.00]	Co-op Work Term II
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#### Semester 5 - Winter

ECON*3100	[0.50]	Game Theory
ECON*3810	[0.50]	Advanced Macroeconomics

1.50 electives or restricted electives\*

#### Spring/Summer

COOP*3000	[0.00]	Co-op Work Term III
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#### Semester 6 - Fall

ECON*3710	[0.50]	Advanced Microeconomics
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2.00 electives or restricted electives\*

#### Winter

COOP*4000	[0.00]	Co-op Work Term IV
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#### Spring/Summer

COOP*5000	[0.00]	Co-op Work Term V
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**Semester 7 - Fall**

ECON*4640	[0.50]	Applied Econometrics I
ECON*4700	[0.50]	Advanced Mathematical Economics
ECON*4710	[0.50]	Advanced Topics in Microeconomics

1.00 electives or restricted electives\*

**Semester 8 - Winter**

ECON*4810	[0.50]	Advanced Topics in Macroeconomics
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One of:

ECON*4840	[0.50]	Applied Econometrics II
MATH*3200	[0.50]	Real Analysis
STAT*4080	[0.50]	Data Analysis
STAT*4340	[0.50]	Statistical Inference
STAT*4350	[0.50]	Applied Multivariate Statistical Methods
STAT*4360	[0.50]	Applied Time Series Analysis

0.50 credits at the 4000 level Economics

1.00 electives

\*at least 1.00 credits of the 4.00 restricted electives credits must be from Mathematics and 1.00 credits must be from Statistics. The remaining 2.00 credits can be from either subject area. Of the 4.00 credits, at least 1.00 credits must be at the 3000 level or above and the remaining 3.00 credits must be at the 2000 level or above.

**Note:** Courses from MATH or STATS will be allowed with the appropriate prerequisites, or by permission of the instructor.

**Mathematical Science (MSCI)**

**Department of Mathematics and Statistics, College of Physical and Engineering Science**

**Major (Honours Program)**

Knowledge of Mathematics and Statistics is crucial for understanding our world. This unique program provides a core of both mathematics and statistics with a choice of a Mathematics stream or a Statistics stream. This major also requires the completion of an area of emphasis as listed. Students are encouraged to speak with a Program Counsellor when choosing courses for the selected stream and area of emphasis.

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major must consult the Faculty Advisor. A total of 20.00 credits is required to complete the Major which includes at least 10.00 credits in Mathematics & Statistics, 0.50 credits in Computing and Information Science, and an additional 2.50 credits in an area of emphasis. Of the total credits required, students are required to complete 2.00 mathematics and/or statistics credits at the 4000 level and an additional 3.00 mathematics and/or statistics credits must be at the 3000 or 4000 level.

**Semester 1**

MATH*1160	[0.50]	Linear Algebra I
MATH*1200	[0.50]	Calculus I

1.50 credits selected from the College of Arts and the College of Social and Applied Human Sciences\*

**Semester 2**

MATH*1210	[0.50]	Calculus II
STAT*2040	[0.50]	Statistics I

1.50 electives\*\* (PHIL\*2110 is recommended)

**Semester 3**

CIS*1500	[0.50]	Introduction to Programming
MATH*2200	[0.50]	Advanced Calculus I
STAT*3100	[0.50]	Introductory Mathematical Statistics I

1.00 electives or restricted electives

**Semester 4**

MATH*2130	[0.50]	Numerical Methods
STAT*2050	[0.50]	Statistics II

1.50 electives or restricted electives (CIS\*2500 is recommended)

**Semester 5**

2.50 electives or restricted electives

**Semester 6**

2.50 electives or restricted electives

**Semester 7**

2.50 electives or restricted electives

**Semester 8**

MATH*4440	[0.50]	Case Studies in Mathematics and Statistics
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2.00 electives or restricted electives

\*These courses should be chosen from the list of Semester 1 requirements as listed in the Program Regulations for the BA.

\*\*Students are reminded that they must meet the BA distribution requirements of 1.50 credits in the humanities and 1.50 credits in the social sciences.

Students are required to complete 5.50 credits from either the Mathematics Stream or the Statistics Stream as follows:

**Mathematics Stream**

MATH*2210	[0.50]	Advanced Calculus II
MATH*2270	[0.50]	Applied Differential Equations
MATH*3160	[0.50]	Linear Algebra II
MATH*3200	[0.50]	Real Analysis

0.50 additional credits in MATH at 3000 level or above

3.00 additional credits in MATH or STAT at 3000 level or above of which at least 1.50 credits must be MATH at the 4000 level

**Statistics Stream**

STAT*3110	[0.50]	Introductory Mathematical Statistics II
STAT*3240	[0.50]	Applied Regression Analysis

0.50 additional credits in MATH at 3000 level or above

1.00 additional credits in MATH or STAT at 2000 level or above

3.00 additional credits in MATH or STAT at 3000 level or above of which at least 1.50 credits must be STAT at the 4000 level

**Areas of Emphasis**

Students are required to complete 2.50 credits from one of the following Areas of Emphasis:

**COMPUTER SCIENCE (CS)\*\*\***

The following credits must be taken:

CIS*2430	[0.50]	Object Oriented Programming
CIS*2500	[0.50]	Intermediate Programming
CIS*2520	[0.50]	Data Structures

at least 1.00 credits from:

CIS*3110	[0.50]	Operating Systems I
CIS*3190	[0.50]	Software for Legacy Systems
CIS*3490	[0.50]	The Analysis and Design of Computer Algorithms
CIS*3530	[0.50]	Data Base Systems and Concepts

Note: CIS\*2750 is recommended in addition to the Area of Emphasis requirements for students interested in Computer Science

**ECONOMICS (ECON)\*\*\***

The following credits must be taken:

ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2310	[0.50]	Intermediate Microeconomics

at least 1.00 credits from:

ECON*3100	[0.50]	Game Theory
ECON*3710	[0.50]	Advanced Microeconomics
ECON*4710	[0.50]	Advanced Topics in Microeconomics

**INDIVIDUALIZED (IND)\*\*\***

It is required that 2.50 credits are taken from humanities and social science electives where 1.00 credits must be at the 3000 level or above.

\*\*\*Students are reminded that they must meet the BA requirement that at least 7.00 credits must be at the 3000 level or above.

**Mathematics (MATH)**

**Department of Mathematics and Statistics, College of Physical and Engineering Science**

Knowledge of mathematics is crucial for understanding our world. Students can choose to study mathematics as a minor in the B.A. Honours Program or as an area of concentration in the General Program. These specializations are designed to provide considerable flexibility for students to pursue their own mathematical interests, whether they be in the concepts of "pure" mathematics or techniques and applications. The Mathematics specializations develop skills that are valued in many sectors such as business, education, government, and industry.

**Area of Concentration (General Program)**

A minimum of 5.00 Mathematics credits is required, including:

- 4.00 credits in Mathematics, including at least 1.00 from courses at the 3000 level or above
- 1.00 additional credits from Mathematics, Statistics and/or Computing Science

**Minor (Honours Program)**

A total of 5.00 credits is required to complete the Minor including:

(MATH\*1080 or MATH\*1200)\*

(MATH\*1210 or MATH\*2080)\*\*

MATH*1160	[0.50]	Linear Algebra I
MATH*2200	[0.50]	Advanced Calculus I
STAT*2040	[0.50]	Statistics I

1.00 additional Mathematics credits at the 2000 level or above.

1.50 additional Mathematics credits at the 3000 or 4000 level

\* IPS\*1500 can count toward this 0.50 credit

\*\* IPS\*1510 can count toward this 0.50 credit



## Media & Cinema Studies (MCST)

College of Arts

This minor considers the various approaches to media, communication, and culture. By examining conventions used across media forms and texts, students are expected to demonstrate an understanding of the relationship between form and content, media and society, technology and culture. Attention will be given to cinema, sound/music, visual culture, and digital/Internet texts and practices. The minor in Media and Cinema Studies (MCST) guides students to an understanding of the pertinent questions at stake in today's technological and information-focused environments.

### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

ARTH*2220	[0.50]	The Visual Arts Today
THST*1200	[0.50]	The Languages of Media

At least 0.50 credits from Media Studies:

THST*2450	[0.50]	Approaches to Media Studies
THST*2650	[0.50]	History of Communication

At least 0.50 credits from Cinema Studies:

EURO*1100	[0.50]	European Cinema
HIST*3260	[0.50]	Cinema and the Moving Image
THST*2500	[0.50]	Contemporary Cinema
THST*3530	[0.50]	Canadian Cinema

At least 0.50 credits from Computing and Information Science:

CIS*1200	[0.50]	Introduction to Computing
CIS*1500	[0.50]	Introduction to Programming
CIS*2050	[0.50]	Computers and Society

2.50 additional credits from:

ARTH*2290	[0.50]	History of Photographic Media
CIS*1200	[0.50]	Introduction to Computing
CIS*1500	[0.50]	Introduction to Programming
CIS*2050	[0.50]	Computers and Society
CIS*2170	[0.75]	User Interface Design
EURO*1100	[0.50]	European Cinema
HIST*2020	[0.50]	Film as History
HIST*3260	[0.50]	Cinema and the Moving Image
HIST*4170	[1.00]	Exploration of Digital Humanities
HUMN*2020	[0.50]	The Criminal Mind in Italian Cinema
HUMN*3190	[0.50]	Experiential Learning
HUMN*3470	[0.50]	Holocaust & WWII in German Lit. & Film
HUMN*4190	[0.50]	Experiential Learning
MUSC*2100	[0.50]	Creating Music on the Computer
MUSC*2150	[0.50]	Music and Popular Culture
MUSC*2220	[0.50]	Electronica: Music in the Digital Age
MUSC*2380	[0.50]	Classical Music from Concert Hall to Cinema
SART*1150	[0.50]	Contemporary Artistic Practice
SART*2610	[0.50]	Photography I
SART*2700	[0.50]	Digital Media I
SART*2710	[0.50]	Digital Media II
SART*3750	[0.50]	Photography II
SART*3480	[0.50]	Digital Media III
THST*1040	[0.50]	Introduction to Performance
THST*2450	[0.50]	Approaches to Media Studies
THST*2500	[0.50]	Contemporary Cinema
THST*2650	[0.50]	History of Communication
THST*3530	[0.50]	Canadian Cinema

At least 1.00 credits must be at 3000 level or higher

**Note:** Some courses may also have prerequisites which are identified in course descriptions in the academic calendar.

### Museum Studies (MS)

School of Fine Art and Music

The Minor program in Museum Studies offers an introduction to museum culture from both theoretical and practical perspectives. Courses in the program cover the history of museums, examination of assumptions that have guided the collecting and classifying of visual culture, and consideration of how these institutions serve the needs of national and group identity construction.

This program of study is designed as a complement to a significant number of Major specializations, suitable for any student wishing to broaden their knowledge beyond their Major area of study.

### Minor (Honours Program)

(May not be taken in combination with Art History Honours Major).

A minimum of 5.00 credits is required, including:

• ARTH*1510	[0.50]	Art Historical Studies I
ARTH*1520	[0.50]	Art Historical Studies II
ARTH*2120	[0.50]	Introduction to Museology

ARTH*2480	[0.50]	Introduction to Art Theory and Criticism
ARTH*3330	[0.50]	Display: Visual Culture in Western Europe
ARTH*3620	[0.50]	Museum Studies

- 2.00 additional credits in Art History

## Music (MUSC)

School of Fine Art and Music, College of Arts

The School offers courses in music history, theory, ethnomusicology, composition, pedagogy, jazz and improvisation, popular music, digital music, and performance. Many courses are open to all students, while others require knowledge of the rudiments of musical notation or other prerequisites. Students are urged to plan their program in consultation with a Music advisor. Music programs allow considerable flexibility for students to select one or more areas of interest, such as individual study on an instrument or in composition, performing in vocal or instrumental ensembles, specialized historical or theoretical study or in-depth study in other music topics.

Courses in Music are offered in several of the semesters abroad, especially London. Credit for programs of study successfully completed may be applied towards the University of Guelph degree requirements.

### Applied Music

MUSC\*1500 is available only by audition. MUSC\*1500 is restricted to students in Semesters 1-4 who are enrolled in a Music program: general program, area of concentration; honours program, major or minor. Students enrolled in a Music program, honours major, may audition for MUSC\*1500 beyond the fourth semester.

*Applied Music courses are designed to be taken during successive Fall and Winter terms. If this sequence is interrupted for more than one semester, students may be required to reapply (re-audition) before registering to continue in Applied Music. Students must achieve a minimum grade 70% in Applied Music courses in order to proceed to the next level.*

### Core Requirements

The Music core is designed to provide the concepts and skills students need for successful study in higher level courses. All students in honours program major must complete the following courses:

MUSC*1060	[0.50]	Amadeus to Zeppelin: Music and Culture I
MUSC*1180	[0.50]	Musicianship I
MUSC*2100	[0.50]	Creating Music on the Computer
MUSC*2140	[0.50]	History of Jazz
MUSC*2150	[0.50]	Music and Popular Culture
MUSC*2180	[0.50]	Musicianship II
MUSC*2270	[0.50]	World Music
MUSC*2330	[0.50]	Beethoven to Broadway: Music and Culture II
MUSC*2660	[0.50]	Materials of Music I
MUSC*3010	[0.50]	Materials of Music II
MUSC*3630	[0.50]	Tragedy, Technology, and Torture: Music Post 1900

Note: MUSC\*1130 does not count toward either the Major (Honours), Minor (Honours), or Area of Concentration (General Program).

### Area of Concentration (General Program)

A minimum of 6.00 Music credits is required, including:

- MUSC\*1060, MUSC\*1180, MUSC\*2180, MUSC\*2330, MUSC\*2660, MUSC\*3010 (3.00 credits)
- 1.50 credits from MUSC\*2100, MUSC\*2140, MUSC\*2150, MUSC\*2270, MUSC\*3630
- at least 1.00 Music credits at the 3000 level or above (excluding MUSC\*3630)
- two of MUSC\*2530, MUSC\*2540, MUSC\*2550, MUSC\*2560.

### Major (Honours Program)

A minimum of 9.00 Music credits is required, including:

- the Music core (5.50 credits)
- two of MUSC\*2530, MUSC\*2540, MUSC\*2550, MUSC\*2560.
- (MUSC\*4460 and MUSC\*4470) or MUSC\*4450
- 2.00 additional credits of upper-level topics courses (MUSC\*3730, MUSC\*3740, MUSC\*3800, MUSC\*3820, MUSC\*3860, MUSC\*3880)

*Participation in Applied Music courses is strongly recommended for all honours students. Students contemplating graduate studies in Music should consult music faculty early in their program.*

Music majors are advised to take MUSC\*1180 in Fall Year 1, followed by MUSC\*2180 in Winter Year 1.

### Minor (Honours Program)

A minimum of 5.00 Music credits is required, including:

MUSC*1060	[0.50]	Amadeus to Zeppelin: Music and Culture I
MUSC*1180	[0.50]	Musicianship I

One of:

MUSC*2030	[0.50]	Music in Canada
MUSC*2100	[0.50]	Creating Music on the Computer

MUSC*2140	[0.50]	History of Jazz
MUSC*2150	[0.50]	Music and Popular Culture
MUSC*2220	[0.50]	Electronica: Music in the Digital Age
MUSC*2270	[0.50]	World Music

At least 1.50 Music credits at the 3000 or 4000 level

**Note:** Students should be aware that courses at the 3000 or 4000 level may require additional prerequisites.

2.00 additional credits in Music

## Philosophy (PHIL)

### Department of Philosophy, College of Arts

Our programs are designed to educate students about philosophical discussions of central questions in ethics, political philosophy, theory of knowledge, metaphysics and philosophy of science, among other areas. This includes learning the history of these subjects as well as understanding current debates. In gaining this knowledge students develop crucial skills of articulation, critical thinking, intellectual independence and the ability to understand others' viewpoints and assumptions. It is important that students discuss their programs with a Faculty Advisor (<https://www.uoguelph.ca/uaic/facultyadvisors-ba>) in order to ensure that the best selection of elective Philosophy courses is made. This is especially important for students who are contemplating graduate work in Philosophy.

Students may take PHIL\*1000, PHIL\*1010, PHIL\*1030 and PHIL\*1050 but only one may be counted towards the minimum number of Philosophy courses required for a degree.

### Area of Concentration (General Program)

5.00 Philosophy credits are required, as follows:

PHIL*2240	[0.50]	Knowledge and Belief
PHIL*2370	[0.50]	Metaphysics and Mind

One of:

PHIL*2120	[0.50]	Ethics
PHIL*2280	[0.50]	Key Concepts in Political Philosophy

One of:

PHIL*2100	[0.50]	Critical Thinking
PHIL*2110	[0.50]	Formal Logic

1.50 credits in Philosophy

**Note:** Students may only count 0.50 credits at the 1000 level towards this requirement.

1.50 credits in Philosophy at the 3000 level or higher

### Major (Honours Program)

8.50 Philosophy credits are required, as follows

PHIL*2120	[0.50]	Ethics
PHIL*2140	[0.50]	Ancient Greek Philosophy
PHIL*2160	[0.50]	Early Modern Philosophy: Reason vs. Experience
PHIL*2280	[0.50]	Key Concepts in Political Philosophy
PHIL*2370	[0.50]	Metaphysics and Mind
PHIL*3100	[0.50]	Kant and His Legacy
PHIL*4820	[0.50]	Philosophy Research Presentation

One of:

PHIL*2100	[0.50]	Critical Thinking
PHIL*2110	[0.50]	Formal Logic

One of:

PHIL*2180	[0.50]	Philosophy of Science
PHIL*2240	[0.50]	Knowledge and Belief

1.50 credits in Philosophy

**Note:** Students may only count 0.50 credits at the 1000 level towards this requirement.

1.50 credits in Philosophy at the 3000 level or higher

1.00 credits in Philosophy at the 4000 level or higher

### Minor (Honours Program)

5.00 Philosophy credits are required, as follows:

PHIL*2240	[0.50]	Knowledge and Belief
PHIL*2370	[0.50]	Metaphysics and Mind

One of:

PHIL*2120	[0.50]	Ethics
PHIL*2280	[0.50]	Key Concepts in Political Philosophy

One of:

PHIL*2100	[0.50]	Critical Thinking
PHIL*2110	[0.50]	Formal Logic

1.00 credits in Philosophy

**Note:** Students may only count 0.50 credits at the 1000 level towards this requirement.

2.00 credits in Philosophy at the 3000 level or higher

## Political Science (POLS)

### Department of Political Science, College of Social and Applied Human Sciences

The Department of Political Science offers courses in the following areas: Political Thought; Canadian Politics; Public Policy, Governance, and Law; Comparative Politics; and International Relations and Global Studies. The Department of Political Science also participates in several interdisciplinary programs, including Criminal Justice and Public Policy, International Development Studies, Environmental Governance, and European Studies.

Students taking courses in Political Science may enrol initially in POLS\*1150, POLS\*1400, POLS\*1500, the latter 2 courses providing overview and introductory treatments of particular interest to students who wish to take higher level courses in the department but who do not intend to specialize in the discipline. For students intending to pursue a general or honours specialization in Political Science, however, POLS\*1150 is required.

Courses at the 2000 level provide students with essential grounding in specific areas of the discipline and are normally prerequisite for enrolment in 3000 and 4000 level courses. Students in the honours program major are required to take POLS\*3180 and POLS\*3650. Students in the honours program minor are required to take POLS\*3180.

In addition to the requirements set out in the B.A. Program Regulations, the Department of Political Science requires that students pursuing general and honours programs successfully complete a core requirement of 2.50 credits and meet specific distribution requirements as follows:

### Core Requirements

POLS*1150	[0.50]	Understanding Politics
POLS*2300	[0.50]	Canadian Government and Politics

One of:

PHIL*2280	[0.50]	Key Concepts in Political Philosophy
POLS*2000	[0.50]	Political Theory

One of:

POLS*2080	[0.50]	Development and Underdevelopment
POLS*2100	[0.50]	Comparative Politics
POLS*2200	[0.50]	International Relations

One of:

POLS*2150	[0.50]	Gender and Politics
POLS*2250	[0.50]	Public Administration and Governance
POLS*2350	[0.50]	Law from a Political Science Perspective

### Area of Concentration (General Program)

A minimum of 5.00 credits is required, including:

POLS*1150	[0.50]	Understanding Politics
POLS*2300	[0.50]	Canadian Government and Politics

One of:

PHIL*2280	[0.50]	Key Concepts in Political Philosophy
POLS*2000	[0.50]	Political Theory

One of:

POLS*2080	[0.50]	Development and Underdevelopment
POLS*2100	[0.50]	Comparative Politics
POLS*2200	[0.50]	International Relations

One of:

POLS*2150	[0.50]	Gender and Politics
POLS*2250	[0.50]	Public Administration and Governance
POLS*2350	[0.50]	Law from a Political Science Perspective

2.50 additional credits, at least 1.50 of which must be at the 3000 level or above.

### Major (Honours Program)

A minimum of 9.00 credits is required, including:

POLS*1150	[0.50]	Understanding Politics
POLS*2300	[0.50]	Canadian Government and Politics
POLS*3180	[0.50]	Research Methods I: Political Inquiry and Methods
POLS*3650	[0.50]	Research Methods II: Quantitative Methods

One of:

PHIL*2280	[0.50]	Key Concepts in Political Philosophy
POLS*2000	[0.50]	Political Theory

One of:

POLS*2080	[0.50]	Development and Underdevelopment
POLS*2100	[0.50]	Comparative Politics
POLS*2200	[0.50]	International Relations

One of:

POLS*2150	[0.50]	Gender and Politics
POLS*2250	[0.50]	Public Administration and Governance
POLS*2350	[0.50]	Law from a Political Science Perspective

at least 0.50 credits at the 3000 level in three of the five fields in the department

1.50 credits at the 4000 level, two of which must include either one course from the 1.00 credit-weighted research and writing intensive seminar courses or two courses which comprise the POLS\*4970/POLS\*4980 Honours Thesis sequence.

4000 level courses that fulfill the Honours writing and research intensive course requirement:

POLS*4050	[1.00]	Advanced Topics in Law and Politics
POLS*4070	[1.00]	Courts and Parliament

POLS*4100	[1.00]	Women, Justice and Public Policy
POLS*4140	[1.00]	Conceptions of Canada
POLS*4160	[1.00]	Multi-Level Governance in Canada
POLS*4200	[1.00]	International Political Economy
POLS*4250	[1.00]	Topics in Public Management
POLS*4260	[1.00]	Topics in Public Policy
POLS*4300	[1.00]	Human Rights, Ethics, and Development
POLS*4340	[1.00]	Nationalism, State-building and Identity
POLS*4710	[1.00]	Topics in Comparative Politics
POLS*4720	[1.00]	Topics in International Relations
POLS*4730	[1.00]	International Relations of the Middle East
POLS*4740	[1.00]	Advanced Topics in Rights and Liberties
POLS*4900	[1.00]	Special Topics Seminar in Political Science
POLS*4970	[0.50]	Honours Political Science Research I

an additional 2.50 credits from courses in Political Science.

\*\* Students interested in pursuing graduate or professional studies related to Political Science are encouraged to consider taking the POLS\*4970/POLS\*4980 Honours Thesis sequence. Interested students must obtain instructor consent in order to register for this option.

### Minor (Honours Program)

A minimum of 5.00 credits is required, including:

POLS*1150	[0.50]	Understanding Politics
POLS*2300	[0.50]	Canadian Government and Politics
POLS*3180	[0.50]	Research Methods I: Political Inquiry and Methods

One of:

PHIL*2280	[0.50]	Key Concepts in Political Philosophy
POLS*2000	[0.50]	Political Theory

One of:

POLS*2080	[0.50]	Development and Underdevelopment
POLS*2100	[0.50]	Comparative Politics
POLS*2200	[0.50]	International Relations

One of:

POLS*2150	[0.50]	Gender and Politics
POLS*2250	[0.50]	Public Administration and Governance
POLS*2350	[0.50]	Law from a Political Science Perspective

0.50 credits at the 4000 level

1.50 additional credits from courses in Political Science

Choices for fulfillment of prerequisites for 4000 level courses (see course descriptions for corresponding requirements).

### Political Thought

POLS*3230	[0.50]	Modern Political Thought
POLS*3710	[0.50]	Politics and Sexuality

### Canadian Politics

HIST*3160	[0.50]	Canadian Political History
POLS*3050	[0.50]	Canadian Political Parties, Elections and Pressure Groups
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3270	[0.50]	Local Government in Ontario
POLS*3470	[0.50]	Business-Government Relations in Canada

### Public Policy, Governance and Law

POLS*3130	[0.50]	Law, Politics and Judicial Process
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3250	[0.50]	Public Policy: Challenges and Prospects
POLS*3300	[0.50]	Governing Criminal Justice
POLS*3370	[0.50]	Environmental Politics and Governance
POLS*3440	[0.50]	Corruption, Scandal and Political Ethics
POLS*3470	[0.50]	Business-Government Relations in Canada
POLS*3670	[0.50]	Comparative Public Policy and Administration

### Comparative Politics

POLS*3000	[0.50]	Politics of Africa
POLS*3060	[0.50]	Politics of the Middle East and North Africa
POLS*3080	[0.50]	Politics of Latin America
POLS*3160	[0.50]	Women and Politics in the Third World
POLS*3320	[0.50]	Politics of Aid & Development
POLS*3410	[0.50]	U.S. Politics and Government
POLS*3440	[0.50]	Corruption, Scandal and Political Ethics
POLS*3450	[0.50]	European Governments and Politics
POLS*3670	[0.50]	Comparative Public Policy and Administration
POLS*3890	[0.50]	Government and Politics of India
POLS*3920	[0.50]	Modern China

### International Relations and Global Studies

POLS*3160	[0.50]	Women and Politics in the Third World
POLS*3320	[0.50]	Politics of Aid & Development
POLS*3490	[0.50]	Conflict and Conflict Resolution
POLS*3790	[0.50]	The Political Economy of International Relations

The Department of Political Science offers a academic advising service for students in Political Science.

Students are encouraged to consult with the faculty advisor for either of these programs about course selection, substitution of courses offered by other departments, or other matters.

## Psychology (PSYC)

### Department of Psychology, College of Social and Applied Human Sciences

The discipline of Psychology is normally associated with the social sciences, the biological sciences, and the health professions. Specialization in Psychology at Guelph is available as a B.A. Honours program major and minor and a B.A. General program area of concentration, all of which are described below, as well as a B.A. Honours program Co-op major (PSYC:C).

Through its different undergraduate programs, the Psychology Department provides: a) a broad general education emphasizing psychological theory and methodology, with an empirical basis in course work (e. g., experiments and projects); b) an appropriate background in psychology for those who leave the University with an undergraduate degree to embark on careers in related areas; and c) a sound preparation for graduate study in Psychology. Students intending to apply to Psychology graduate programs, and those who want a structured, intensive research experience, may apply to enrol in the Honours Thesis courses (See Option B – Honours Thesis Stream). In addition, students intending to apply for admission to graduate programs in Psychology should note most graduate programs require the applicant to have at least an A- average in order to be considered for admission.

### Note on Honours Courses

Courses designated with (H) are for students in Psychology Honours programs. These include: B.A. Honours Psychology (PYSC, PYSC:C) major or minor and the Neuroscience (NEUR) major or minor. A cumulative average of at least 70% in all course attempts in Psychology, NEUR major or minor, or PBC major or minor is required to enrol in H designated courses.

### Advising Note

We advise students to take PSYC\*1000 in their first semester and PSYC\*1010 and PSYC\*1500 in their second semester

The maximum number of PSYC credits students can take at each level is as follows:

1000 level courses:	no cap
2000 level courses:	3.50 credits
3000 level courses:	3.50 credits
4000 level courses:	3.00 credits

### Area of Concentration (General Program)

A total of 6.00 credits are required for the Psychology Area of Concentration.

#### Year 1

Students must complete 1.50 credits at the 1000 level in Psychology, including:

PSYC*1000	[0.50]	Introduction to Psychology
PSYC*1010	[0.50]	Making Sense of Data in Psychological Research
PSYC*1500	[0.50]	Foundational Skills for Psychology

#### Year 2

Students must complete 2.50 credits at the 2000 level in Psychology, including:

PSYC*2070	[0.50]	Teams, Leadership, and Professional Behaviour
PSYC*2360	[0.50]	Psychological Methods and Statistics

One of:

PSYC*2330	[0.50]	Principles of Learning
PSYC*2390	[0.50]	Sensation and Perception
PSYC*2410	[0.50]	Behavioural Neuroscience I
PSYC*2650	[0.50]	Cognitive Psychology

Two of:

PSYC*2020	[0.50]	Abnormal Psychology
PSYC*2310	[0.50]	Social Psychology
PSYC*2450	[0.50]	Developmental Psychology
PSYC*2740	[0.50]	Personality

#### Year 3

Students must complete 1.50 credits at the 3000 level in Psychology, including:

PSYC*3470	[0.50]	Putting Psychology to Work
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1.00 additional credit in PSYC at the 3000 level.

Finally, students are required to take an additional 0.50 credit in PSYC at the 2000 level or above.

### Major (Honours Program)

A total of 9.00 credits are required for the Psychology major BAH.

#### Year 1

Students must complete 1.50 credits at the 1000 level in Psychology, including:

PSYC*1000	[0.50]	Introduction to Psychology
PSYC*1010	[0.50]	Making Sense of Data in Psychological Research

PSYC*1500	[0.50]	Foundational Skills for Psychology
<b>Year 2</b>		
Students must complete 3.00 credits at the 2000 level in Psychology, including:		
PSYC*2070	[0.50]	Teams, Leadership, and Professional Behaviour
PSYC*2360	[0.50]	Psychological Methods and Statistics
Two of:		
PSYC*2330	[0.50]	Principles of Learning
PSYC*2390	[0.50]	Sensation and Perception
PSYC*2410	[0.50]	Behavioural Neuroscience I
PSYC*2650	[0.50]	Cognitive Psychology
Two of:		
PSYC*2020	[0.50]	Abnormal Psychology
PSYC*2310	[0.50]	Social Psychology
PSYC*2450	[0.50]	Developmental Psychology
PSYC*2740	[0.50]	Personality

### OPTION A - HONOURS REGULAR STREAM

#### Year 3

Students must complete 3.00 credits at the 3000 level in Psychology, including:

PSYC*3000	[0.50]	Historical and Critical Perspectives on Psychology
PSYC*3250	[0.50]	Psychological Measurement
PSYC*3290	[0.50]	Conducting Statistical Analyses in Psychology

1.50 additional credit in Psychology at 3000 level.

#### Year 4

Students must complete 1.50 credits at the 4000 level in Psychology, including

PSYC*4540	[1.00]	Practical Applications of Psychology
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0.50 additional credit in Psychology at 4000 level.

### OPTION B – HONOURS THESIS STREAM

The Honours Thesis stream is recommended for students considering graduate work, as most graduate programs in Psychology expect that students will have completed an undergraduate thesis or equivalent. The two honours thesis courses (PSYC\*4870 and 4880) are normally taken in a Fall-Winter sequence. Registration for these courses requires Department approval, which is normally granted to those students whose academic performance meets the minimum admission requirements of Psychology graduate programs.

#### Year 3

Students must complete 2.50 credits at the 3000 level in Psychology, including:

PSYC*3000	[0.50]	Historical and Critical Perspectives on Psychology
PSYC*3250	[0.50]	Psychological Measurement
PSYC*3290	[0.50]	Conducting Statistical Analyses in Psychology

1.0 additional credit in Psychology at 3000 level.

#### Year 4

Students must complete 2.00 credits at the 4000 level in Psychology, comprised of:

PSYC*4780	[0.50]	Advanced Research Methods and Statistics
PSYC*4870	[0.50]	Honours Thesis I
PSYC*4880	[1.00]	Honours Thesis II

**Note:** Students should note that the Honours Thesis courses are normally taken in a Fall-Winter sequence and are worth the equivalent of 1.50 credits toward the 20.00 credits Honours B.A. degree requirements.

### Minor (Honours Program)

(May not be taken in combination with a Psychology Honours Major)

A total of 5.00 credits are required for the Psychology Minor, including:

PSYC*1000	[0.50]	Introduction to Psychology
PSYC*1010	[0.50]	Making Sense of Data in Psychological Research
PSYC*2360	[0.50]	Psychological Methods and Statistics

An additional 2.00 credits selected from the following:

PSYC*2020	[0.50]	Abnormal Psychology
PSYC*2310	[0.50]	Social Psychology
PSYC*2330	[0.50]	Principles of Learning
PSYC*2390	[0.50]	Sensation and Perception
PSYC*2410	[0.50]	Behavioural Neuroscience I
PSYC*2450	[0.50]	Developmental Psychology
PSYC*2650	[0.50]	Cognitive Psychology
PSYC*2740	[0.50]	Personality

An additional 1.50 credits at the 3000 level in Psychology.

**Note:** There is a maximum number of Psychology credits a student may complete. Please refer to the major for further information.

### Psychology (Co-op) (PSYC:C)

Department of Psychology, College of Social and Applied Human Sciences

Co-operative Education formally integrates the student's academic study with 3 work terms (COOP\*1000, COOP\*2000, COOP\*3000) in co-operating employer organizations. The Co-op program is offered as a B.A. honours program major degree taken as one of two major options combined with three work terms. (Students interested in applying to graduate school in Psychology after graduation should see the Graduate Advisory Note at the end of this section.)

The first work term normally follows three or four semesters of academic study (see Section X-Co-operative Education Programs). Students must be eligible to continue in the Honours Psychology program in order to remain in the Co-op program.

Admission to the Co-op program is limited and will be based on academic background. Admission will normally be considered only at semester 1 entry or during semester 2 when the student selects courses for semester 3.

#### Major (Honours Program)

**Note:** When selecting core and elective credits the student should keep in mind the prerequisites for their desired 3000- and 4000-level courses. When selecting courses beyond Psychology the student should keep in mind both their second specialization (if relevant) and courses appropriate for potential work-term placements.

#### Note on Honours Courses

Courses designated with (H) are for students in Psychology Honours programs. These include: B.A. Honours Psychology (PYSC, PYSC:C) major or minor, B.A. Information Systems and Human Behaviour (ISHB) major and the Neuroscience (NEUR) major or minor. A cumulative average of at least 70% in all course attempts in Psychology or registration in the ISHB major, NEUR minor, or PBC major or minor is required to enrol in H designated courses.

A total of 9.00 credits are required for the Psychology Co-op BAH. Students must complete 1.50 credits at the 1000 level and 3.00 credits at the 2000 level in Psychology. For those in the Honours Regular Stream, students must complete 3.00 credits at the 3000 level and 1.50 credits at the 4000 level in Psychology. For those in the Honours Thesis Stream, students must complete 2.50 credits at the 3000 level and 2.00 credits at the 4000 level in Psychology.

The maximum number of PSYC credits that students can take at each level is as follows:

1000 level courses:	no cap
2000 level courses:	3.50 credits
3000 level courses:	3.50 credits
4000 level courses:	3.00 credits

Students wanting to move more quickly through the program are recommended to take two DE courses in the summer of their first year and/or one DE course during each work term. If they do so, the number of electives required in Semester 8 will depend on how many additional courses the student has taken throughout the program to meet the 20.00 credit requirement.

**Graduate Studies Advisory Note:** Most graduate programs require the student to have at least an A- average in order to be considered for admission. They also require students follow the Honours Thesis Stream. Students planning on applying to graduate school in Psychology will need to take the following courses in the semesters outlined below: PSYC\*3250, PSYC\*3290, PSYC\*4780, PSYC\*4870, and PSYC\*4880.

#### Major (Honours Program)

A total of 9.00 credits are required for the Psychology major BAH.

#### Year 1

##### Semester 1 - Fall

Students should complete:

PSYC*1000	[0.50]	Introduction to Psychology
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2.00 additional credits

##### Semester 2 - Winter

Students should complete:

COOP*1100	[0.00]	Introduction to Co-operative Education
PSYC*1010	[0.50]	Making Sense of Data in Psychological Research
PSYC*1500	[0.50]	Foundational Skills for Psychology

One of:

PSYC*2390	[0.50]	Sensation and Perception
PSYC*2650	[0.50]	Cognitive Psychology

One of:

PSYC*2020	[0.50]	Abnormal Psychology
PSYC*2740	[0.50]	Personality

0.50 additional credits

#### Summer Semester

If students want to progress more quickly through the program or plan to apply to graduate school, they should complete: 1.00 PSYC credits at the 2000 level. If not taken in the summer semester, they must be completed by the end of semester 4.

#### Year 2

##### Semester 3 - Fall

Students should complete:

PSYC*2070	[0.50]	Teams, Leadership, and Professional Behaviour
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PSYC*2360	[0.50]	Psychological Methods and Statistics
One of		
PSYC*2330	[0.50]	Principles of Learning
PSYC*2410	[0.50]	Behavioural Neuroscience I
One of:		
PSYC*2310	[0.50]	Social Psychology
PSYC*2450	[0.50]	Developmental Psychology

0.50 additional credits

**Winter Semester**

COOP*1000	[0.00]	Co-op Work Term I
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**Semester 4 - Summer**

0.50 credits in PSYC at the 3000 level

2.00 additional credits

**OPTION A – HONOURS REGULAR STREAM****Year 3****Fall Semester**

COOP*2000	[0.00]	Co-op Work Term II
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**Semester 5 - Winter**

PSYC*3000	[0.50]	Historical and Critical Perspectives on Psychology
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PSYC*3290	[0.50]	Conducting Statistical Analyses in Psychology
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1.00 additional credits in PSYC at the 3000 level

0.50 additional credits

**Summer Semester**

COOP*3000	[0.00]	Co-op Work Term III
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**Year 4****Semester 6 - Fall**

PSYC*3250	[0.50]	Psychological Measurement
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0.50 additional credits in PSYC at the 4000 level

1.50 additional credits

**Semester 7 - Winter**

PSYC*4540	[1.00]	Practical Applications of Psychology
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1.50 additional credits

**Semester 8 - Summer**

2.50 credits

**OPTION B – HONOURS THESIS STREAM****Year 3****Fall Semester**

COOP*2000	[0.00]	Co-op Work Term II
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**Semester 5 - Winter**

PSYC*3000	[0.50]	Historical and Critical Perspectives on Psychology
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PSYC*3250	[0.50]	Psychological Measurement
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PSYC*3290	[0.50]	Conducting Statistical Analyses in Psychology
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1.00 additional credits

**Summer Semester**

COOP*3000	[0.00]	Co-op Work Term III
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**Year 4****Semester 6 - Fall**

PSYC*4780	[0.50]	Advanced Research Methods and Statistics
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PSYC*4870	[0.50]	Honours Thesis I
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0.50 additional credits in PSYC at the 3000 level

1.00 additional credits at the 3000 or 4000 level

**Semester 7 - Winter**

PSYC*4880	[1.00]	Honours Thesis II
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1.50 additional credits

**Semester 8 - Summer**

2.50 credits

**Sociology (SOC)****Department of Sociology and Anthropology, College of Social and Applied Human Sciences**

The Department of Sociology and Anthropology offers three types of courses: sociology courses with the prefix SOC\*; anthropology courses with the prefix ANTH\*; and departmental courses with the prefix SOAN\*. The departmental category of courses recognizes the fact that the disciplines of sociology and sociocultural anthropology have developed in tandem and it is possible to identify large areas of overlap and convergence in the work of practitioners both historically and in the present. Departmental courses include most of the core theory and methods courses as well as many elective courses. They contribute equally to the subject matter of sociology as well as the subject matter of sociocultural anthropology for purposes of the undergraduate programs of study in both disciplines. Please see the listings for all courses required for the Sociology program.

Note: the following courses may be used towards a sociology specialization:

FRHD*3060	[0.50]	Principles of Social Gerontology
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PHIL*2180	[0.50]	Philosophy of Science
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Courses will normally be offered in the semesters designated. For information on other semesters these courses will be offered and the semester those courses without designations will be offered, please check with the department. In addition to regularly scheduled courses, students may elect to do independent study. A student who wishes to do a reading course should first consult the professor with whom he/she wishes to work. Please note, a student is allowed a total of 1.00 credits only for reading courses.

SOAN courses will be used towards the Sociology specializations.

**Area of Concentration (General Program)**

A minimum of 5.00 credits in Sociology and Anthropology is required, including:

ANTH*1150	[0.50]	Introduction to Anthropology
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SOAN*2111/2	[1.00]	Classical Theory
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SOAN*2120	[0.50]	Introductory Methods
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SOC*1100	[0.50]	Sociology
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2.50 additional credits in SOC and SOAN courses, including at least 1.00 credits at the 3000 level

**Major (Honours Program)**

A minimum of 8.00 credits in Sociology and Anthropology is required, including:

ANTH*1150	[0.50]	Introduction to Anthropology
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SOAN*2111/2	[1.00]	Classical Theory
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SOAN*2120	[0.50]	Introductory Methods
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SOAN*3070	[0.50]	Qualitative and Observational Methods
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SOAN*3120	[0.50]	Quantitative Methods
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SOC*1100	[0.50]	Sociology
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SOC*3310	[0.50]	Contemporary Theory
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4.00 additional credits in SOC and SOAN courses, including at least 1.50 credits at the 4000 level

The following courses may be used toward a sociology specialization:

FRHD*3060	[0.50]	Principles of Social Gerontology
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PHIL*2180	[0.50]	Philosophy of Science
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**Minor (Honours Program)**

A minimum of 5.00 credits in Sociology and Anthropology is required, including:

ANTH*1150	[0.50]	Introduction to Anthropology
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SOAN*2111/2	[1.00]	Classical Theory
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SOAN*2120	[0.50]	Introductory Methods
-----------	--------	----------------------

SOC*1100	[0.50]	Sociology
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2.50 additional credits in SOC and SOAN courses, including at least 1.00 credits at the 3000 level or above

The following courses may be used toward a sociology specialization:

FRHD*3060	[0.50]	Principles of Social Gerontology
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PHIL*2180	[0.50]	Philosophy of Science
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**Spanish and Hispanic Studies (SPAH)****School of Languages and Literatures, College of Arts**

The Spanish and Hispanic Studies program enables students to concentrate on the Spanish language and on Spanish and Latin American literature. Language courses provide study of the grammatical concepts required to establish and enrich reading, writing, oral and aural skills from basic through advanced levels of study. Through literature and film, students are introduced to a variety of cultural, historical, social, and political topics.

The usual first course in Spanish is SPAN\*1100. Students with 4U Spanish commonly take SPAN\*2000. They may be admitted into SPAN\*1110 only with the approval of the Instructor or the Faculty Advisor. Students with native or near native fluency normally begin language courses with SPAN\*2000.

All language students are strongly advised to include LING\*1000 in their program, and CLAS\*1000 among their electives in order to derive the maximum benefit from their studies.

**Study Abroad**

The Spanish and Hispanic Studies program encourages its students to take advantage of the University of Guelph's exchange programs and the semester abroad opportunities. We offer exchange programs with the University of Málaga and the University of Alcalá de Henares in Spain the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM) and the University of Guadalajara (with over 30 campuses) in Mexico and the University of San Andrés in Argentina. Students also enjoy the semester abroad opportunity every second winter in Guatemala. It is recommended that students go on exchange in their third year. In order to be eligible for an exchange, students should have completed at least SPAN\*2010, SPAN\*2990, SPAN\*2040 and SPAN\*3080. Credits successfully completed at the host university are applied towards University of Guelph degree requirements. Please see the International Study section of the undergraduate calendar and consult the Head of Spanish and Hispanic Studies for more information.

**Area of Concentration (General Program)**

A minimum of 5.00 credits in Spanish and Hispanic Studies is required, including:

SPAN*2040	[0.50]	Culture of Spain
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SPAN*2990	[0.50]	Hispanic Literary Studies
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SPAN*3080	[0.50]	Spanish American Culture
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2.50 credits from:

LING*1000	[0.50]	Introduction to Linguistics
LING*2400	[0.50]	Phonetics
SPAN*1100	[0.50]	Introductory Spanish I
SPAN*1110	[0.50]	Introductory Spanish II
SPAN*2000	[0.50]	Intermediate Spanish I
SPAN*2010	[0.50]	Intermediate Spanish II
SPAN*3240	[0.50]	Topics in Hispanic Linguistics
SPAN*3500	[0.50]	Advanced Spanish I
SPAN*3700	[0.50]	Experiential Learning and Language
SPAN*4500	[0.50]	Spanish Translation I

0.50 credits in literature from:

HUMN*1030	[0.50]	What Makes a Literary Classic?
HUMN*3000	[0.50]	Narratives of Migration
SPAN*3210	[0.50]	Topics in Hispanic Studies
SPAN*3220	[0.50]	Literature and Arts I: Spain Pre-1936
SPAN*3230	[0.50]	Literature and Arts II: Latin America Pre-1950
SPAN*3800	[0.50]	Directed Readings in Hispanic Studies
SPAN*3810	[0.50]	Directed Readings in Hispanic Studies
SPAN*4100	[1.00]	Seminar in Hispanic Studies
SPAN*4410	[1.00]	Senior Seminar on Latin American Post-1950
SPAN*4420	[1.00]	Senior Seminar on Spain or Africa Post-1936
SPAN*4840	[1.00]	Research Paper in Hispanic Studies

0.50 additional credits in Spanish and Hispanic Studies

No more than 0.50 credits may be counted from the following: HUMN\*1030, HUMN\*3000, LING\*1000; LING\*2400.

### Major (Honours Program)

A minimum of 8.00 credits in Spanish and Hispanic Studies is required, including:

SPAN*2040	[0.50]	Culture of Spain
SPAN*2990	[0.50]	Hispanic Literary Studies
SPAN*3080	[0.50]	Spanish American Culture

6.50 credits from:

HUMN*1030	[0.50]	What Makes a Literary Classic?
HUMN*3000	[0.50]	Narratives of Migration
LING*1000	[0.50]	Introduction to Linguistics
LING*2400	[0.50]	Phonetics
SPAN*1100	[0.50]	Introductory Spanish I
SPAN*1110	[0.50]	Introductory Spanish II
SPAN*2000	[0.50]	Intermediate Spanish I
SPAN*2010	[0.50]	Intermediate Spanish II
SPAN*3210	[0.50]	Topics in Hispanic Studies
SPAN*3220	[0.50]	Literature and Arts I: Spain Pre-1936
SPAN*3230	[0.50]	Literature and Arts II: Latin America Pre-1950
SPAN*3240	[0.50]	Topics in Hispanic Linguistics
SPAN*3500	[0.50]	Advanced Spanish I
SPAN*3700	[0.50]	Experiential Learning and Language
SPAN*3800	[0.50]	Directed Readings in Hispanic Studies
SPAN*3810	[0.50]	Directed Readings in Hispanic Studies
SPAN*4100	[1.00]	Seminar in Hispanic Studies
SPAN*4410	[1.00]	Senior Seminar on Latin American Post-1950
SPAN*4420	[1.00]	Senior Seminar on Spain or Africa Post-1936
SPAN*4500	[0.50]	Spanish Translation I
SPAN*4840	[1.00]	Research Paper in Hispanic Studies

No more than 1.00 credits may be counted from the following: HUMN\*1030, HUMN\*3000, LING\*1000; LING\*2400.

### Minor (Honours Program)

A minimum of 5.00 credits in Spanish and Hispanic Studies is required, including:

SPAN*2040	[0.50]	Culture of Spain
SPAN*2990	[0.50]	Hispanic Literary Studies
SPAN*3080	[0.50]	Spanish American Culture

2.50 credits from:

LING*1000	[0.50]	Introduction to Linguistics
LING*2400	[0.50]	Phonetics
SPAN*1100	[0.50]	Introductory Spanish I
SPAN*1110	[0.50]	Introductory Spanish II
SPAN*2000	[0.50]	Intermediate Spanish I
SPAN*2010	[0.50]	Intermediate Spanish II
SPAN*3240	[0.50]	Topics in Hispanic Linguistics
SPAN*3500	[0.50]	Advanced Spanish I
SPAN*3700	[0.50]	Experiential Learning and Language
SPAN*4500	[0.50]	Spanish Translation I

1.00 credits in literature from:

HUMN*1030	[0.50]	What Makes a Literary Classic?
HUMN*3000	[0.50]	Narratives of Migration
SPAN*3210	[0.50]	Topics in Hispanic Studies
SPAN*3220	[0.50]	Literature and Arts I: Spain Pre-1936

SPAN*3230	[0.50]	Literature and Arts II: Latin America Pre-1950
SPAN*3800	[0.50]	Directed Readings in Hispanic Studies
SPAN*3810	[0.50]	Directed Readings in Hispanic Studies
SPAN*4100	[1.00]	Seminar in Hispanic Studies
SPAN*4410	[1.00]	Senior Seminar on Latin American Post-1950
SPAN*4420	[1.00]	Senior Seminar on Spain or Africa Post-1936
SPAN*4840	[1.00]	Research Paper in Hispanic Studies

No more than 0.50 credits may be counted from the following: HUMN\*1030, HUMN\*3000, LING\*1000; LING\*2400.

Students wishing to substitute required courses with courses taken abroad, or other options, should consult the Head of Spanish and Hispanic Studies.

### Statistics (STAT)

#### Department of Mathematics and Statistics, College of Physical and Engineering Science

Knowledge of statistics is crucial for understanding our world. An understanding of statistics is vital in many disciplines including psychology, sociology, political science, marketing and economics. Students can choose to study statistics as a minor in the B.A. Honours Program or as an area of concentration in the General Program.

#### Area of Concentration (General Program)

A minimum of 5.00 credits in Statistics and Mathematics is required, including:

- no more than 1.00 credits from courses at the 1000 level
- 3.00 credits in statistics (STAT), 2.00 of which must be from courses at the 3000 level or above

#### Recommended Courses

MATH*1200	[0.50]	Calculus I
MATH*1210	[0.50]	Calculus II
STAT*2040	[0.50]	Statistics I
STAT*2050	[0.50]	Statistics II
STAT*3100	[0.50]	Introductory Mathematical Statistics I
STAT*3110	[0.50]	Introductory Mathematical Statistics II
STAT*3240	[0.50]	Applied Regression Analysis

0.50 additional credits in Statistics

0.50 additional credits in Statistics or Mathematics

### Honours Programs

#### Minor (Honours Program)

A total of 5.00 credits is required to complete the minor, including:

(MATH\*1080 or MATH\*1200)\*

(MATH\*1210 or MATH\*2080)\*\*

MATH*1160	[0.50]	Linear Algebra I
STAT*2040	[0.50]	Statistics I
STAT*2050	[0.50]	Statistics II
STAT*3100	[0.50]	Introductory Mathematical Statistics I
STAT*3110	[0.50]	Introductory Mathematical Statistics II
STAT*3240	[0.50]	Applied Regression Analysis

0.50 additional credits in Statistics

0.50 additional credits in Statistics or Mathematics at the 2000 level or above

\* IPS\*1500 can count toward this 0.50 credit

\*\* IPS\*1510 can count toward this 0.50 credit

**Note:** students may not count MATH\*1030 toward a minor in Statistics

### Studio Art (SART)

#### School of Fine Art and Music, College of Arts

The School offers programs that allow for concentrated study in Art History or in Studio Art, or a combination of the two disciplines.

The Studio Art program provides a thorough grounding in contemporary art practice, art history, theory, and criticism. Courses are offered in drawing, painting, photography, printmaking, sculpture, computer graphics, and extended practices. Studio Art majors must also take a selection of courses in art history. Specific requirements are listed below.

#### Cost of Studio Supplies

The majority of the cost of supplies must be borne by the student. In order to permit the University to subsidize this cost and to allow for savings through discount buying, some materials are obtained through the school by payment of a lab fee. The amount of the fee is established for each semester prior to registration.

## Student Counselling

Students who elect to take a substantial number of credits in Studio Art with the objective of graduate work are advised to obtain counseling from their academic advisor regarding their choices. However, in general, it is important to know that graduate studies in Studio Art normally require an in-depth knowledge of traditional and contemporary media, as well as a significant awareness of contemporary art history and theory. Students are encouraged to take electives in other disciplines from across the University to inform their Studio Art practice. Cognate electives in other disciplines in the College of Arts, such as Philosophy, History, and English will almost certainly prove an asset.

Students wishing to declare the SART minor must have a cumulative average of 70% or higher in the following courses:

SART*1050	[0.50]	Foundation Studio
SART*1060	[0.50]	Core Studio

One of:

ARTH*1510	[0.50]	Art Historical Studies I
ARTH*1520	[0.50]	Art Historical Studies II

Students who have not been admitted directly into the major must also meet these requirements in order to declare a SART major.

## Major (Honours Program)

A minimum of 9.00 credits is required, including:

SART*1050	[0.50]	Foundation Studio
SART*1060	[0.50]	Core Studio

One of:

ARTH*1510	[0.50]	Art Historical Studies I
ARTH*1520	[0.50]	Art Historical Studies II

One of:

ARTH*2220	[0.50]	The Visual Arts Today
ARTH*2480	[0.50]	Introduction to Art Theory and Criticism

One of:

SART*2090	[0.50]	Drawing I
SART*2200	[0.50]	Painting I
SART*2460	[0.50]	Printmaking I
SART*2610	[0.50]	Photography I
SART*2700	[0.50]	Digital Media I
SART*2710	[0.50]	Digital Media II

One of:

SART*2300	[0.50]	Sculpture I
SART*2800	[0.50]	Extended Practices I

4.00 additional credits in Studio Art including 1.50 credits at the 4000 level.

2.00 additional credits in Art History including at least 0.50 credits at the 3000 level or above.

## Minor (Honours Program)

A minimum of 5.00 credits is required, including:

SART*1050	[0.50]	Foundation Studio
SART*1060	[0.50]	Core Studio

One of:

ARTH*1510	[0.50]	Art Historical Studies I
ARTH*1520	[0.50]	Art Historical Studies II

One of:

SART*2090	[0.50]	Drawing I
SART*2200	[0.50]	Painting I
SART*2460	[0.50]	Printmaking I
SART*2610	[0.50]	Photography I
SART*2700	[0.50]	Digital Media I
SART*2710	[0.50]	Digital Media II

One of:

SART*2300	[0.50]	Sculpture I
SART*2800	[0.50]	Extended Practices I

1.00 additional credits in Art History including at least 0.50 credits at the 3000 level or above.

1.00 additional credits in Studio Art including at least 0.50 credits at the 3000 level or above.

0.50 additional credits in either Studio Art (SART) or Art History (ARTH) courses.

### Notes:

- In accordance with the B.A. program regulation limiting the number of credits to be taken in any subject area, OCAD graduates granted the maximum advanced standing of credits in Studio Arts will be limited to 2.00 additional credits in Studio Arts at the University of Guelph.
- A cumulative average of at least 70% in all course attempts in Studio Arts and Art History is required in order to enter or continue in the Honours Studio Arts program.

## Theatre Studies (THST)

School of English and Theatre Studies, College of Arts

The Theatre Studies program is a component of a liberal education, and is dedicated to integrating academic study and theatre practice. The program offers introductory and advanced courses that combine theory and practice with an emphasis on educating well-rounded theatre creators for both the academic and professional spheres. Students will have the opportunity to work on both scripted and devised productions and do in-depth research and analysis. Rather than a focus on individual disciplines such as acting, directing, design and technical theatre, the program integrates this knowledge into a series of variable topic courses that examine performance from various perspectives. Many of these courses have presentational or performance outcomes.

### Notes:

- A maximum of 2.00 credits in Directed Readings or Special Studies Courses (THST\*3000, THST\*3600) is allowed in the honours program major. A maximum of 1.00 credits in such courses is allowed in honours program minor or the general program area of concentration. Students will normally be permitted to take only 0.50 credits in Directed Readings or Special Studies courses per semester.

Certain approved Dramatic Literature courses from the English Program within the School of English and Theatre Studies or other departments may be counted towards a degree in Theatre Studies. A list of approved courses may be obtained from the School's website: <http://www.arts.uoguelph.ca/sets/>.

- In connection with THST\*1040 and some upper-level courses, students are required as part of the course to attend various specified theatre performances in cities such as Toronto, Stratford, Niagara-on-the-Lake, and London. A special fee is charged for travel to these performances and students will be notified during the first week of classes of the amount of this fee and the dates of the performances.
- In any given semester, a student may not enroll in more than ONE production-related course at a time. These include: THST\*2190, THST\*3190, THST\*4280.

## Area of Concentration (General Program)

A minimum of 5.00 credits in Theatre Studies is required, including :

THST*1040	[0.50]	Introduction to Performance
THST*1190	[0.50]	Theatre Workshop I
THST*1270	[0.50]	Theatre Research I
THST*2050	[0.50]	Devising
THST*2270	[0.50]	Theatre Research II
THST*3170	[0.50]	Special Topics

1.00 additional credit in THST at the 2000 level or above

1.00 additional credit in THST at the 3000 level or above

## Major (Honours Program)

A minimum of 8.50 credits in Theatre Studies is required, including:

THST*1040	[0.50]	Introduction to Performance
THST*1190	[0.50]	Theatre Workshop I
THST*1270	[0.50]	Theatre Research I
THST*2050	[0.50]	Devising
THST*2190	[1.00]	Theatre Workshop II
THST*2270	[0.50]	Theatre Research II
THST*3170	[0.50]	Special Topics
THST*4270	[0.50]	Research Seminar I
THST*4280	[1.00]	Ensemble Project

1.00 additional credit in THST at the 2000 level or above

2.00 additional credits in THST at the 3000 level or above

## Minor (Honours Program)

A minimum of 5.00 credits in Theatre Studies is required, including :

THST*1040	[0.50]	Introduction to Performance
THST*1190	[0.50]	Theatre Workshop I
THST*1270	[0.50]	Theatre Research I
THST*2050	[0.50]	Devising
THST*2270	[0.50]	Theatre Research II
THST*3170	[0.50]	Special Topics

1.00 additional credit in THST at the 2000 level or above

1.00 additional credit in THST at the 3000 level or above

## Bachelor of Arts and Sciences (B.A.S.)

The University of Guelph offers an 8 semester (20.00 credits) honours program leading to a Bachelor of Arts and Sciences (B.A.S.) degree.

The Bachelor of Arts & Sciences program is designed for students who are motivated equally by the study of Arts/Social Sciences and the Sciences, and who find challenge and satisfaction in testing the traditional boundaries of study through undergraduate level interdisciplinary work. The program meets these objectives through a unique structure that accredits students in an Arts/Social Sciences core, a Sciences core, a Subject Area core of interdisciplinary humanities and sciences courses (ASCI\*), and a minor in each of the Arts/Social Sciences and the Sciences (see program information for choices of minors). The structure of the program ensures disciplinary rigour and breadth through completion of core requirements for a B.A.S. degree, concentration in two distinct minors, and concentration of learning in an academic cohort of B.A.S. students through the interdisciplinary ASCI courses in the B.A.S. core. This core is open only to students in the B.A.S. program.

### Program Information

#### Academic Counselling

The B.A.S. program counsellor assists students in the selection of minors, interpreting program and academic regulations, and with the selection of appropriate courses for chosen minors and distribution requirements. Students should consult the counsellor when experiencing particular difficulties affecting academic standing and progress through the program. Students are encouraged to check the B.A.S. program website regularly for course information and cross-listing of acceptable credits where appropriate.

#### Counselling on Minors

Academic departments offer the minors in the B.A.S. program and assign faculty advisors to assist students with academic planning (e.g., a faculty advisor in the History department handles queries about a minor in History). Students should consult the appropriate faculty advisor, along with the B.A.S. Program Counsellor, when requiring advice on the completion of specialization requirements. The list of faculty advisors is available on the Undergraduate Academic Information Centre website: <http://www.uoguelph.ca/uaic/facultyadvisors> or contact the B.A.S. Program Counsellor for further information.

#### Continuation of Study

To be eligible to continue in the program, students must meet the requirements for Continuation of Study as noted in Section VIII--Undergraduate Degree Regulations & Procedures of this calendar (Schedules 1 and 2).

#### Conditions for Graduation

To qualify for the degree Bachelor of Arts and Sciences, the student must successfully complete a minimum of 20.00 credits as identified below. In addition, students must meet the continuation of study requirements at the time of graduation and have a 60.00% cumulative average.

#### Distribution Requirements

This program will require the completion of 20.00 credits as indicated below, with a maximum of 7.00 credits at the 1000 level. First year core courses may be counted towards the minors.

Of the 20.00 credits required for this program, 3.00 credits must be completed at the 3000 or 4000 level, and 2.00 credits at the 4000 level. This requirement is partially fulfilled by senior level courses in the Subject Core (ASCI) requirements.

1. Science Core - 2.00 credits.
2. Arts/Social Science core - 2.00 credits.
3. Subject Area Core - (ASCI) - 3.00 credits.
4. Arts/Social Science Minor - 5.00 credits minimum.
5. Science Minor - 5.00 credits minimum.
6. Free Electives - 3.00 credits.

#### 1. Science Core - 2.00 credits

When choosing their courses in the science core, students are advised to keep prerequisites for their BAS Science Minor in mind. For a list of suggested core science courses for each specific BAS Science Minor, please consult the BAS website (<https://www.uoguelph.ca/bas/>)

2.00 credits from:

BIOC*2580	[0.50]	Introduction to Biochemistry
BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
CHEM*1050	[0.50]	General Chemistry II
CIS*1500	[0.50]	Introduction to Programming
CIS*2500	[0.50]	Intermediate Programming
GEOG*1300	[0.50]	Introduction to the Biophysical Environment
GEOG*2460	[0.50]	Analysis in Geography
IPS*1500	[1.00]	Integrated Mathematics and Physics I
IPS*1510	[1.00]	Integrated Mathematics and Physics II

MATH*1080	[0.50]	Elements of Calculus I
MATH*1200	[0.50]	Calculus I
MATH*1210	[0.50]	Calculus II
MATH*2080	[0.50]	Elements of Calculus II
PHYS*1070	[0.50]	Physics for Life Sciences II
PHYS*1080	[0.50]	Physics for Life Sciences
PHYS*1300	[0.50]	Fundamentals of Physics
STAT*2040	[0.50]	Statistics I
STAT*2050	[0.50]	Statistics II

#### 2. Arts and Social Science Core - 2.00 credits

- 1.00 credits over at least 2 different subject areas in the College of Arts: ARTH - Art History; CHIN - Mandarin; CLAS - Classical Studies; ENGL - English; EURO - European Studies; FREN - French Studies; GERM - German Studies; GREK - Greek; HIST - History; HUMN - Humanities; ITAL - Italian Studies; LAT - Latin Studies; LING - Linguistics; MUSC - Music; PHIL - Philosophy; PORT - Portuguese; SART - Studio Art; SPAN - Spanish and Hispanic Studies; THST - Theatre Studies.
- 1.00 credits over at least 2 different subject areas (listed below) in the College of Social and Applied Human Sciences or College of Business and Economics: ANTH - Anthropology; ECON - Economics; FRHD - Family Relations and Human Development; GEOG - Geography; IDEV - International Development Studies; ISS - Interdisciplinary Social Science; POLS - Political Science; PSYC - Psychology; SOAN - Sociology and Anthropology; SOC - Sociology; UNIV - Interdisciplinary University; WMST - Women Studies.

#### 3. Subject Area Core (ASCI) - 3.00 credits

- 1.50 credits from:
 

ASCI*1110	[0.50]	Society and Inquiry I
ASCI*1120	[0.50]	Society and Inquiry II
ASCI*2050	[0.50]	Uses of Knowledge
- 0.50 credits from:
 

ASCI*3000	[0.50]	Arts and Sciences Community Project
ASCI*3100	[0.50]	Case Studies in Arts and Sciences Research
ASCI*3700	[0.50]	Independent Studies in Arts/Sciences
- 1.00 credits from:
 

ASCI*4010	[1.00]	Arts and Sciences Honours Research Seminar
ASCI*4020	[0.50]	Topics in Arts and Sciences Research
ASCI*4030	[0.50]	Topics in Arts and Sciences Research
ASCI*4700	[0.50]	Independent Studies in Arts/Sciences
ASCI*4710	[0.50]	Independent Studies in Arts/Sciences

#### 4. Arts/Social Sciences Minors - 5.00 credits (Minimum)

Minors available in the Arts/ Social Sciences core (see B.A. program descriptions):

Anthropology  
 Art History  
 Business  
 Business Economics  
 Classical Studies  
 Criminal Justice & Public Policy  
 Economics  
 English  
 European Culture and Civilization  
 Family & Child Studies  
 French Studies  
 Geography  
 German  
 History  
 International Development  
 Italian  
 Marketing  
 Media and Cinema Studies  
 Museum Studies  
 Music  
 Philosophy  
 Political Science  
 Psychology  
 Sociology  
 Spanish and Hispanic Studies  
 Theatrer Studies

#### 5. Science Minor - 5.00 credits (Minimum)

Minors available in the Science core (see B.Sc. program descriptions):

Agriculture (see B.Sc.(Agr.) program description)  
 Biochemistry



Biology  
Biotechnology  
Chemistry  
Computing & Information Science  
Ecology  
GIS\* & Environmental Analysis  
Mathematics  
Mathematical Science  
Microbiology  
Molecular Biology and Genetics  
Neuroscience  
Nutritional and Nutraceutical Sciences  
Physics  
Plant Science  
Psychology: Brain and Cognition  
Statistics  
Zoology

\* Geographic Information Systems

**Note:** Students cannot select Psychology or Mathematics for both their B.Sc. and B.A. minors.

#### **6. Free Electives - 3.00 credits**

The program includes 3.00 free electives. Electives may be completed in any subject area.

#### **Double Counting Rule**

A maximum of 3.00 credits may be double-counted:

- a. 1.00 credits may be double-counted between minors.
- b. Up to 1.00 credits may be double-counted between the science core and a minor; and up to 1.00 credits may be double-counted between the arts and social science core and a minor.

Students may not triple-count a course between a core and two minors.

## Bachelor of Bio-Resource Management Degree (B.B.R.M.)

The University of Guelph offers a 20.00 credit program, normally completed over 8 semesters, leading to a Bachelor of Bio-Resource Management degree (B.B.R.M.).

This degree is a unique blend of applied and theoretical learning, with an emphasis on experiential learning opportunities. At the present time, two majors, Environmental Management and Equine Management, are available in the program.

### Program Information

The Bachelor of Bio-Resource Management degree program combines business studies and technical training with a strong emphasis on hands-on learning. A solid foundation in applied aspects of science, technology and business provides graduates with sufficient breadth and expertise to become competent managers in the environmental or equine fields. Students begin studying in one of the following management majors during the first semester: Environmental Management, Equine Management.

Students will be encouraged to integrate their academic program with a well-planned series of employment activities in the summer months and to develop their leadership and interpersonal skills in on-campus and community activities. There is a strong commitment in the curriculum to personal development and students are encouraged to identify goals that they wish to accomplish throughout their university career.

### Academic Advising and Counselling

#### Program Counselling

The Bachelor of Bio-Resource Program Counsellor is available to assist in-course students who require information or advice about their program or other academic regulations and who seek information about resources available to students. For information about how to contact a program counsellor, and for more information about program counselling, see Section VII -- Academic Counselling of the current Undergraduate Calendar.

#### Departmental Advising

On entering the program all students are assigned to a faculty advisor who will mentor them throughout their first two years. The faculty advisor is familiar with the academic requirements of the program and is aware of career opportunities. Students are strongly encouraged to attend all meetings called by their advisor, and to set up individual meetings with him/her when they have questions or concerns about their performance or progress in the program.

### Continuation of Study

Students are advised to consult the regulations for Continuation of Study which are outlined in detail in Section VIII -- Undergraduate Degree Regulations & Procedures in the current calendar.

### Conditions for Graduation

To qualify for the degree Bachelor of Bio-Resource Management, the student must successfully complete a minimum of 20.00 credits as set out in the Schedule of Studies as listed. In addition, students must meet the continuation of study requirements at the time of graduation and have a minimum cumulative average of 60%.

### Schedule of Studies

Courses specified in the Schedule of Studies are required courses and must be successfully completed. A full time course load normally includes 2.50 credits.

### B.B.R.M. Program Regulations

#### Recommendations

Students entering the degree program who are deficient in U level Mathematics or Chemistry should consult with the program counsellor.

### Environmental Management Major (EM)

School of Environmental Sciences and Department of Food, Agricultural and Resource Economics

The major in Environmental Management focuses on the development of leaders in the areas of environmental science and technology. The program combines a solid background in environmental science and management with business, using a mix of theoretical and applied study. The flexibility provided in semesters 6 through 8 permits students to develop their understanding of specific areas of environmental science and business or take a variety of areas within the discipline. This flexibility also allows students to participate in international exchanges and semesters abroad. Students have the opportunity to incorporate a variety of field trips, experiential learning in the workplace and independent research projects into their program.

This major will require the completion of 20.00 credits: 12.00 from required courses, 6.00 from restricted electives, and 2.00 free electives. Of these credits, a minimum of 6.00 credits are required at the 3000 level or higher, of which at least 2.00 credits must be at the 4000 level.

#### Semester 1

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
ENVS*1030	[1.00]	Introduction to Environmental Sciences

MGMT*2150	[0.50]	Introduction to Canadian Business Management
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#### Semester 2

ACCT*1220	[0.50]	Introductory Financial Accounting
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
FARE*1040	[1.00]	Intro to Environmental Economics, Law & Policy
HROB*2090	[0.50]	Individuals and Groups in Organizations

#### Semester 3

BIOL*2060	[0.50]	Ecology
ENVS*2060	[0.50]	Soil Science
ENVS*2230	[0.50]	Communications in Environmental Science
FARE*2700	[0.50]	Survey of Natural Resource Economics
GEOG*2480	[0.50]	Mapping and GIS

#### Semester 4

ENVM*3500	[1.00]	Environmental Management Integrated Project
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*2080	[0.50]	Introduction to Environmental Microbiology
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management

#### Semester 5

GEOG*2420	[0.50]	The Earth From Space
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One of:

GEOG*2460	[0.50]	Analysis in Geography
STAT*2060	[0.50]	Statistics for Business Decisions

1.50 electives or restricted electives

#### Semester 6

ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3060	[0.50]	Groundwater

1.50 electives or restricted electives

#### Semester 7

2.50 electives or restricted electives

#### Semester 8

2.50 electives or restricted electives

### Restricted Electives

Students must successfully complete a minimum of 6.00 credits at the 3000 level or higher, of which at least 2.00 credits must be at the 4000 level. Those credits at the 3000 level or above selected to satisfy lists A, B, and C below will be applied to satisfy these minimum credit requirements.

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

Students should consult with a faculty advisor before Semester 5 in planning their restricted elective choices. Students are advised to pay particular attention to prerequisite requirements when choosing individual courses and seek advice as needed.

1. Students must select a minimum of 6.00 credits from the following lists of restricted electives.

#### List A

Students must select a minimum of 3.00 credits from any of the following courses without regard to group of which at least 1.00 credits must be at the 4000 level:

##### Aquatic Science:

BIOL*3450	[0.50]	Introduction to Aquatic Environments
CHEM*3360	[0.50]	Environmental Chemistry and Toxicology
EDRD*3450	[0.50]	Watershed Planning Practice
ENVS*3220	[0.50]	Terrestrial Chemistry
ENVS*4370	[0.50]	Environmental Organic Chemistry
GEOG*3610	[0.50]	Environmental Hydrology

##### Atmospheric Science:

ENVS*2030	[0.50]	Meteorology and Climatology
ENVS*2310	[0.50]	Earth Surface Processes
ENVS*3340	[0.50]	Use and Management of Environmental Data
GEOG*2110	[0.50]	Climate and the Biophysical Environment

##### Conservation and Biodiversity Science:

BIOL*3060	[0.50]	Populations, Communities & Ecosystems
BIOL*3130	[0.50]	Conservation Biology
ENVS*2210	[0.50]	Apiculture and Honey Bee Biology
ENVS*2330	[0.50]	Current Issues in Ecosystem Science and Biodiversity
ENVS*3000	[0.50]	Nature Interpretation
ENVS*3010	[0.50]	Climate Change Biology
ENVS*3090	[0.50]	Insect Diversity and Biology
ENVS*3230	[0.50]	Agroforestry Systems
ENVS*3250	[0.50]	Forest Health and Disease
ENVS*3270	[0.50]	Forest Biodiversity
ENVS*4070	[0.50]	Pollinator Conservation
ENVS*4230	[0.50]	Biology of Aquatic Insects

ENVS*4260	[0.50]	Field Entomology
ENVS*4350	[0.50]	Forest Ecology
GEOG*3320	[0.50]	Food Systems: Issues in Security and Sustainability
Ecosystem and Resource Management:		
BIOL*4500	[0.50]	Natural Resource Policy Analysis
ENVS*2120	[0.50]	Introduction to Environmental Stewardship
ENVS*2240	[0.50]	Fundamentals of Environmental Geology
ENVS*3030	[0.50]	Conservation Field Course
ENVS*4390	[1.00]	Soil Variability and Land Evaluation
GEOG*2210	[0.50]	Environment and Resources
GEOG*3020	[0.50]	Global Environmental Change
GEOG*3110	[0.50]	Biotic and Natural Resources
GEOG*3210	[0.50]	Management of the Biophysical Environment
GEOG*3420	[0.50]	Remote Sensing of the Environment
GEOG*3480	[0.50]	GIS and Spatial Analysis
GEOG*4110	[1.00]	Environmental Systems Analysis
GEOG*4220	[0.50]	Local Environmental Management
GEOG*4230	[0.50]	Environmental Impact Assessment

Plant Health:		
ENVS*3040	[0.50]	Natural Chemicals in the Environment
ENVS*3210	[0.50]	Plant Pathology
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests
ENVS*4180	[0.50]	Insecticide Biological Activity and Resistance
ENVS*4190	[0.50]	Biological Activity of Herbicides

Soil and Nutrient Management:		
ENVS*3080	[0.50]	Soil and Water Conservation
ENVS*3310	[0.50]	Soil Biodiversity and Ecosystem Function
ENVS*4090	[0.50]	Soil Management
ENVS*4160	[0.50]	Soil and Nutrient Management
ENVS*4320	[1.00]	Laboratory and Field Methods in Soil Biodiversity
ENVS*4390	[1.00]	Soil Variability and Land Evaluation

**List B**

Students must select a minimum of 1.50 credits from list B. At least 0.50 credits must be at the 4000 level:

Accounting		
ACCT*2230	[0.50]	Management Accounting
ACCT*3230	[0.50]	Intermediate Management Accounting
ACCT*1240	[0.50]	Applied Financial Accounting
ACCT*4230	[0.50]	Advanced Management Accounting

Business and Management:		
MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management

Food, Agricultural and Resource Economics:		
FARE*2410	[0.50]	Agri-food Markets and Policy
FARE*3170	[0.50]	Cost-Benefit Analysis
FARE*3310	[0.50]	Operations Management
FARE*4290	[0.50]	Land Economics
FARE*4310	[0.50]	Resource Economics
FARE*4360	[0.50]	Marketing Research
FARE*4370	[0.50]	Food & Agri Marketing Management

Leadership and Communications:		
EDRD*2020	[0.50]	Interpersonal Communication
EDRD*3140	[0.50]	Organizational Communication
EDRD*3400	[0.50]	Sustainable Communities
EDRD*4120	[0.50]	Leadership Development in Small Organizations
HROB*2010	[0.50]	Foundations of Leadership
HROB*4010	[0.50]	Leadership Certificate Capstone

**List C**

Students may also select any of the following courses a restricted electives:

AGR*3450	[0.50]	Research Methods in Agricultural Science
AGR*3500	[0.50]	Experiential Education I
AGR*4450	[1.00]	Research Project I
AGR*4460	[1.00]	Research Project II
AGR*4600	[1.00]	Agriculture and Food Issues Problem Solving
BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*1050	[0.50]	General Chemistry II
ECON*1100	[0.50]	Introductory Macroeconomics
ENVS*3410	[0.50]	Independent Research I
ENVS*3420	[0.50]	Independent Research II
ENVS*3430	[1.00]	Independent Research
ENVS*4410	[1.00]	Advanced Independent Research I
ENVS*4420	[1.00]	Advanced Independent Research II
ENVS*4430	[2.00]	Advanced Independent Research
FARE*4550	[0.50]	Independent Studies I
FARE*4560	[0.50]	Independent Studies II
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

GEOG*1350	[0.50]	Earth: Hazards and Global Change
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\* Students considering graduate studies are encouraged to take at least 1.00 of these credits.

**Equine Management Major (EQM)**

Department of Animal Biosciences and the Department of Food, Agricultural and Resource Economics

The major in Equine Management focuses on the development of leaders with a genuine regard for all horses and their well-being, a conscious concern for the environment, and a passionate interest in all aspects of the horse industry. The program combines a solid background in business, biological sciences and equine management through practical and theoretical experience. It provides in-depth understanding of the economic, environmental and social dimensions of all equine disciplines with a broad and current knowledge of horse industry issues and develops the skills to gather, access, interpret and apply industry data. In consultation with the faculty advisor, students can participate in international exchange or semester abroad opportunities in semester 6. Students can also incorporate a variety of field trips, experiential learning in the workplace and independent research projects into their program.

This major will require the completion of 20.00 credits: 14.00 from required courses, 5.00 from restricted electives and 1.00 electives. Of these credits, a minimum of 6.00 credits are required at the 3000-level or higher, of which at least 2.00 credits must be at the 4000-level.

**Semester 1 - Fall**

BIOL*1050	[0.50]	Biology of Plants & Animals in Managed Ecosystems
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
ECON*1050	[0.50]	Introductory Microeconomics
EQN*1010	[1.00]	Introduction to Equine Management

**Semester 2 - Winter**

ACCT*1220	[0.50]	Introductory Financial Accounting
ANSC*1210	[1.00]	Principles of Animal Care and Welfare
EQN*2040	[0.50]	Equine Anatomy and Physiology

One of:

CHEM*1040	[0.50]	General Chemistry I
CHEM*1100	[0.50]	Chemistry Today

**Semester 3 - Fall**

ACCT*2230	[0.50]	Management Accounting
ENVS*2060	[0.50]	Soil Science
EQN*2060	[0.50]	Equine Event Management I
EQN*2200	[0.50]	Equine Industry Trends and Issues I

0.50 electives or restricted electives

**Semester 4 - Winter**

EQN*2050	[0.50]	Introduction to Equine Nutrition
EQN*2070	[0.50]	Equine Event Management II
EQN*2150	[0.50]	Equine Facility Management and Design

1.00 electives or restricted electives

**Semester 5 - Fall**

AGR*2030	[0.50]	Pasture Management
ANSC*3080	[0.50]	Agricultural Animal Physiology
EQN*3070	[0.50]	Equine Health Management
STAT*2060	[0.50]	Statistics for Business Decisions

0.50 electives or restricted electives

**Semester 6 - Winter**

EQN*3050	[0.50]	Equine Exercise Physiology
EQN*3150	[0.50]	Equine Exercise Physiology Laboratory

1.50 electives or restricted electives

**Semester 7 - Fall**

EQN*3500	[1.00]	Equine Integrated Project
EQN*4400	[0.50]	Equine Industry Trends and Issues II

1.00 electives or restricted electives

**Semester 8 - Winter**

EQN*3060	[0.50]	Equine Reproduction
EQN*4020	[0.50]	Advanced Equine Nutrition

1.50 electives or restricted electives

**Restricted Electives**

Students must successfully complete a minimum of 6.00 credits at the 3000 level or higher, of which at least 2.00 credits must be at the 4000 level.

Students must select a minimum of 5.00 credits from the following four lists of restricted electives.

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

1. Students must select a minimum of 1.50 credits from any of the following lists (grouped by topic areas):

Animal Biology:

AGR*2350	[0.50]	Animal Production Systems, Health and Industry
ANSC*4090	[0.50]	Applied Animal Behaviour
ANSC*4100	[0.50]	Applied Environmental Physiology and Animal Housing
ANSC*4490	[0.50]	Applied Endocrinology
ANSC*4650	[0.50]	Comparative Immunology
POPM*4230	[0.50]	Animal Health

Genetics:

MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics
MBG*3060	[0.50]	Quantitative Genetics
MBG*4020	[0.50]	Genetics of Companion Animals
MBG*4030	[0.50]	Animal Breeding Methods and Applications

Pasture and Turf Management:

CROP*3340	[0.50]	Managed Grasslands
ENVS*3080	[0.50]	Soil and Water Conservation
ENVS*3140	[0.50]	Management of Turfgrass Diseases

One of:

ENVS*4090	[0.50]	Soil Management
ENVS*4160	[0.50]	Soil and Nutrient Management
HORT*2450	[0.50]	Introduction to Turfgrass Science
HORT*3050	[0.50]	Management of Turfgrass Insect Pests and Weeds
HORT*4450	[0.50]	Advanced Turfgrass Science

Advanced Nutrition:

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*1050	[0.50]	General Chemistry II
NUTR*3210	[0.50]	Fundamentals of Nutrition

2. Students must select a minimum of 1.50 credits during semesters 5-8 from any of the following lists (grouped by topic areas):

Accounting:

ACCT*3230	[0.50]	Intermediate Management Accounting
ACCT*4230	[0.50]	Advanced Management Accounting

Business and Management:

HROB*2010	[0.50]	Foundations of Leadership
HROB*2090	[0.50]	Individuals and Groups in Organizations
HROB*4010	[0.50]	Leadership Certificate Capstone
MGMT*2150	[0.50]	Introduction to Canadian Business Management
MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management

Food, Agricultural and Resource Economics :

FARE*2700	[0.50]	Survey of Natural Resource Economics
FARE*3310	[0.50]	Operations Management
FARE*3170	[0.50]	Cost-Benefit Analysis
FARE*4220	[0.50]	Advanced Agribusiness Management
FARE*4360	[0.50]	Marketing Research
FARE*4370	[0.50]	Food & Agri Marketing Management
FARE*4290	[0.50]	Land Economics
FARE*4550	[0.50]	Independent Studies I

Marketing:

MCS*1000	[0.50]	Introductory Marketing
MCS*2020	[0.50]	Information Management
MCS*2600	[0.50]	Fundamentals of Consumer Behaviour
MCS*3000	[0.50]	Advanced Marketing
MCS*3040	[0.50]	Business and Consumer Law
MCS*3620	[0.50]	Marketing Communications

3. Students must select a minimum of 1.00 credits during semesters 5-8 from:

AGR*3010	[0.50]	Special Studies in Agricultural Science I
AGR*4010	[0.50]	Special Studies in Agricultural Science II
AGR*4600	[1.00]	Agriculture and Food Issues Problem Solving
AGR*4450	[1.00]	Research Project I
AGR*4460	[1.00]	Research Project II
ANSC*4610	[0.50]	Critical Analysis in Animal Science

4. Students may also count any of the following courses as restricted electives:

AGR*3500	[0.50]	Experiential Education I
AGR*3510	[0.50]	Experiential Education II
ECON*1100	[0.50]	Introductory Macroeconomics
EDRD*2020	[0.50]	Interpersonal Communication
EDRD*3050	[0.50]	Agricultural Communication I
EDRD*3140	[0.50]	Organizational Communication
EDRD*3400	[0.50]	Sustainable Communities
EDRD*4120	[0.50]	Leadership Development in Small Organizations
EQN*2500	[0.50]	Equine Field Course
PSYC*1000	[0.50]	Introduction to Psychology

## Bachelor of Commerce (B.Comm.)

The University of Guelph offers an eight semester (20.00 credits) honours program leading to a Bachelor of Commerce degree (B.Comm.). The normal course load is 2.50 credits per semester for a full-time student. The program is of an interdisciplinary nature and designed to give students a sound professional management education with a focus on specific industry sectors or management functions which prepare the graduates for positions of responsibility in particular areas of management and business.

Elective options enable students to select courses which support or complement their primary field of study.

In their first semester, students may be admitted to one of eight specialized majors or enter as “undeclared”. Students in the undeclared first year, must declare a specialized major by mid-February in semester two in order to gain access to required courses in semester three.

### Bachelor of Commerce Majors

Most majors in the Bachelor of Commerce program are also available in the Co-operative Education (Co-op) option.

Undeclared (only available in semesters one and two)

Accounting

Food and Agricultural Business

Hospitality and Tourism Management

Management Economics and Finance

Marketing Management

Public Management

Real Estate and Housing

In addition to specializing in a major area of study, the B.Comm. core ensures that each major also provides a comprehensive commerce education to all students in the program.

### The B.Comm. Core includes:

#### Year 1

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
MATH*1030	[0.50]	Business Mathematics
MCS*1000	[0.50]	Introductory Marketing
MGMT*1000	[1.00]	Introduction to Business

#### Year 2

ACCT*2230	[0.50]	Management Accounting
ECON*2560	[0.50]	Theory of Finance
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*2020	[0.50]	Information Management

#### Year 3

MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management

#### Year 4

MGMT*4000	[0.50]	Strategic Management
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### Liberal Education Requirement

Other requirements are accommodated by specialized courses within the major or through specific courses chosen by the major from those available on campus.

The following core areas are covered through a choice of courses as determined by your major:

- Law  
HROB\*3050, MCS\*3040, REAL\*4840
- Operations  
FARE\*3310, HTM\*3120
- Statistics  
ECON\*2740, PSYC\*1010, STAT\*2060

## Program Information

### Academic Counselling

#### Program Counselling

Students are urged to seek the assistance of the counsellors in the B.Comm. Counselling Office regarding their program and academic regulations, course selection issues, services and resources, and when they are experiencing difficulties that affect their academic progress.

#### Departmental Advising

On entering the program, all students are assigned to a departmental Faculty Advisor by major. Students should seek the advice of the Faculty Advisor when they have questions or concerns about courses and academic requirements for their program/major. The Faculty Advisor is also knowledgeable about career opportunities which relate to a student's specific major. The list of Faculty Advisors is available on the [Undergraduate Academic Information Centre website: http://www.uoguelph.ca/uaic/students\\_advisors.shtml](http://www.uoguelph.ca/uaic/students_advisors.shtml) or contact the B.Comm. Counselling Office for further information.

### Special Expenses

Expenses may include cost of field trips and supplies and, for some majors, laboratory coats and other protective clothing.

### Study at Other Universities

Students contemplating study at another university for credit towards a Bachelor of Commerce degree at the University of Guelph should refer to the general regulations governing Letters of Permission in Section VII Degree and Regulations and Procedures in this calendar.

Students must obtain approval for the Letter of Permission prior to undertaking studies at another institution. Approval of the request depends on good standing in the program with a minimum cumulative average of 60%.

The total limit of credits taken on a Letter of Permission is 2.50 based on the University of Guelph's credit system.

### Study Abroad

Global understanding and perspectives are regarded as being of central importance among the university's learning objectives, as they are, also, in understanding the international business environment. On both of these accounts, students enrolled in the B.Comm. program are urged to participate in one of the several exchange and study abroad programs specifically designed for the Commerce program. Planning for such participation is best undertaken quite early in the course of studies. For more specific information on possible opportunities refer to Section V -- International Study of the calendar or contact the B.Comm. program counsellor.

### Continuation of Studies

Students are advised to consult the regulations for Continuation of Study within the program which are outlined in detail in Section VIII -- Undergraduate Degree Regulations and Procedures.

### Conditions of Graduation

To qualify for a Bachelor of Commerce degree, the student must satisfy the following conditions:

- The student must successfully complete 1.50 credits from the Liberal Education Requirement list.
- The student must successfully complete a minimum of 20.00 approved credits, in accordance with the Schedule of Studies for the specified major, including the Liberal Education Requirement.
- Students will not be eligible to graduate while on probationary or required-to-withdraw status.

### Liberal Education Requirement

The Liberal Education Requirement is designed to provide the student with exposure to and some understanding of a range of disciplines in the Arts, Humanities, Social Sciences, and Mathematical and Natural Sciences.

The Liberal Education Requirement consists of 1.50 credits. The course prefixes listed below **cannot** be used to satisfy the Liberal Education Requirement:

ACCT Accounting  
 BUS Business  
 ECON Economics  
 FARE Food, Agricultural and Resource Economics  
 HROB Human Resources and Organizational Behaviour  
 HTM Hospitality and Tourism Management  
 MGMT Management  
 MCS Marketing and Consumer Studies  
 REAL Real Estate and Housing

### Free Electives

Free Electives allow students to select courses that support or complement their primary field of study. Students may select undergraduate courses from any department, including Commerce/Business related courses, provided any individual course restrictions and prerequisites are satisfied. These courses can be at any year level.

The total number of Free Electives allowed varies by major (refer to the Schedule of Studies for details). Free Electives cannot be used to fulfill Required Core courses, Restricted Electives or Liberal Education Electives, but they could contribute to the total number of credits required for graduation.

### Honours Minor

A minor is a group of courses which provide exposure to and mastery of the fundamental principles of a subject. A minor consists of a minimum of 5.00 credits (normally 10 courses). It may also require certain other courses from other areas to be taken along with the specified courses of the minor. A minor is taken in conjunction with a major. Students cannot earn a minor in the same subject area as their major. Additionally, students in the BComm program are not permitted to earn a minor in Business or Business Economics. For a list of Minors, please see Specializations and Their Degrees.

## Double Counting of Credits

A maximum of 2.50 credits required in a major program may be applied to meet the requirements of a minor. Courses used to meet the Liberal Education requirement may not double-count toward the requirements of their major but may double-count towards the completion of a minor.

## Schedule of Studies

Courses specified in the schedule of studies are required courses and must be completed successfully. A full course load normally involves 2.50 credits per semester. Part-time study is also possible although students should discuss this option with their Program Counsellor or Faculty Advisor.

## Undeclared (UND)

### College of Business and Economics

Applicants to the B.Comm program who want a flexible introduction to business studies should consider entering as an unspecialized student. Students must declare one of the 9 majors in order to gain access to required courses. This must be done no later than mid-February in semester two.

## Liberal Education Requirement

As part of the graduation requirement all students within the B.Comm Program are required to complete 1.50 credits from at least two different subject prefixes as listed under the B.Comm. Program Information section of the undergraduate calendar.

## Major

### Semester 1

ECON*1050	[0.50]	Introductory Microeconomics
MATH*1030	[0.50]	Business Mathematics
MGMT*1000	[1.00]	Introduction to Business

One of:

MATH*1200	[0.50]	Calculus I *
POLS*1400	[0.50]	Issues in Canadian Politics *
PSYC*1000	[0.50]	Introduction to Psychology
REAL*1820	[0.50]	Real Estate and Housing *

0.50 elective

\* These courses are offered in the Fall semester only

### Semester 2

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*1000	[0.50]	Introductory Marketing

0.50 electives

\*Students interested in choosing the FAB Major should take FARE\*1400 Economics of the Agri-Food System instead of HROB\*2090 and the 0.50 electives.

Students leaning towards a certain major may use their electives to take courses in that area. Undeclared students are encouraged to meet with a B.Comm. program counsellor for advice on elective selection. Further information on selecting electives for the Undeclared first year can be found on the B.Comm. Program Counselling Office website: <https://www.uoguelph.ca/business/bcomm>

## Accounting (ACCT)

### Department of Management, College of Business and Economics

By combining the conceptual and quantitative elements of accounting while promoting the integration of theory and practice, the accounting major provides graduates with the academic requirements for the postgraduate pursuit of a Professional Accounting designation. Students will develop the technical, analytical, evaluative and communication skills needed for a successful career in accounting and related management areas.

The program provides a strong foundation of accounting and general business knowledge while allowing significant opportunity to develop breadth and depth of knowledge in related areas of study.

Students pursuing a professional accounting designation should visit the Department of Management website for links to the requirements.

Elective options enable students to select courses which support or complement their primary field of study.

## Degree Requirements (20.00 Total Credits)

13.00 - Required Core Courses

1.00 - Restricted Electives (see semester 7 & 8)

1.50 - Liberal Education Electives

4.50 - Free Electives

The recommended program sequence is outlined below.

## Major

### Semester 1

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1050	[0.50]	Introductory Microeconomics
MATH*1030	[0.50]	Business Mathematics

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MGMT*1000	[1.00]	Introduction to Business
<b>Semester 2</b>		
ACCT*1240	[0.50]	Applied Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*1000	[0.50]	Introductory Marketing

0.50 electives

### Semester 3

ACCT*2230	[0.50]	Management Accounting
MCS*2020	[0.50]	Information Management
STAT*2060	[0.50]	Statistics for Business Decisions

1.00 electives

### Semester 4

ACCT*3330	[0.50]	Intermediate Financial Accounting I
ECON*2560	[0.50]	Theory of Finance
MCS*3040	[0.50]	Business and Consumer Law
MGMT*3320	[0.50]	Financial Management

0.50 electives

### Semester 5

ACCT*3280	[0.50]	Auditing I
ACCT*3340	[0.50]	Intermediate Financial Accounting II
ACCT*3350	[0.50]	Taxation
HROB*2290	[0.50]	Human Resources Management

0.50 electives

### Semester 6

ACCT*3230	[0.50]	Intermediate Management Accounting
FARE*3310	[0.50]	Operations Management
MGMT*3020	[0.50]	Corporate Social Responsibility

1.00 electives

### Semester 7 - Fall

ACCT*4220	[0.50]	Advanced Financial Accounting
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### Semester 8 - Winter

ACCT*4230	[0.50]	Advanced Management Accounting
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### Semester 7 or 8 - Fall or Winter

MGMT*4000	[0.50]	Strategic Management
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Two of:

ACCT*4270	[0.50]	Auditing II
ACCT*4290	[0.50]	IT Auditing and Data Analytics
ACCT*4340	[0.50]	Accounting Theory
ACCT*4350	[0.50]	Income Taxation II
ACCT*4440	[0.50]	Integrated Cases in Accounting

2.50 electives

Note: ACCT\*4270 and ACCT\*4350 are offered in the Fall only. ACCT\*4290, ACCT\*4340 and ACCT\*4440 are offered in the Winter only. Students may take MGMT\*4000 in either Fall or Winter.

## Accounting (Co-op) (ACCT:C)

### Department of Management, College of Business and Economics

The Co-op program in Accounting is designed to facilitate the transition of students from academic studies to a professional career by enhancing the integration of theory and practice.

The Co-op in Accounting is a five year program including 4 work terms. Students must follow the academic work schedule as outlined on the Co-operative Education and Career Services website: <https://www.recruitguelph.ca/cecs/>.

In order for students to be eligible to continue in the Co-op program, they must meet a minimum 70% cumulative average requirement after second semester, as well as meet all work term requirements. Please refer to the Co-operative Education program policy with respect to work term performance grading and work term report grading. For additional program information students should consult with their Co-op Co-ordinator and Co-op Faculty Advisor, listed on the Co-operative Education and Career Services website: <https://www.recruitguelph.ca/cecs/>.

Students pursuing a professional accounting designation should visit the Department of Management website for links to the requirements.

Group/Team work is a significant part of core credit work.

## Degree Requirements (20.00 Total Credits)

13.00 - Required Core Courses

1.00 - Restricted Electives (see semester 7 & 8)

1.50 - Liberal Education Electives

4.50 - Free Electives

The recommended program sequence is outlined below.

**Major****Semester 1 -- Fall**

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1050	[0.50]	Introductory Microeconomics
MATH*1030	[0.50]	Business Mathematics
MGMT*1000	[1.00]	Introduction to Business

**Semester 2 -- Winter**

ACCT*1240	[0.50]	Applied Financial Accounting
COOP*1100	[0.00]	Introduction to Co-operative Education
ECON*1100	[0.50]	Introductory Macroeconomics
HROB*2090	[0.50]	Individuals and Groups in Organizations
1.00 electives		

**Semester 3 -- Fall**

ACCT*2230	[0.50]	Management Accounting
ACCT*3330	[0.50]	Intermediate Financial Accounting I
MCS*1000	[0.50]	Introductory Marketing
STAT*2060	[0.50]	Statistics for Business Decisions
0.50 electives		

**Winter Semester**

COOP*1000	[0.00]	Co-op Work Term I
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**Semester 4 -- Summer**

ACCT*3280	[0.50]	Auditing I
ACCT*3340	[0.50]	Intermediate Financial Accounting II
ACCT*3350	[0.50]	Taxation
MCS*2020	[0.50]	Information Management
0.50 electives		

**Semester 5 -- Fall**

ECON*2560	[0.50]	Theory of Finance
FARE*3310	[0.50]	Operations Management
HROB*2290	[0.50]	Human Resources Management
1.00 electives		

**Winter Semester**

COOP*2000	[0.00]	Co-op Work Term II
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**Semester 6 -- Summer**

ACCT*3230	[0.50]	Intermediate Management Accounting
MCS*3040	[0.50]	Business and Consumer Law
MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management
0.50 electives		

**Fall Semester**

COOP*3000	[0.00]	Co-op Work Term III
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(Eight month work term in conjunction with COOP\*4000)

**Winter Semester**

COOP*4000	[0.00]	Co-op Work Term IV
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(Eight month work term in conjunction with COOP\*3000)

**Semester 7 - Fall**

ACCT*4220	[0.50]	Advanced Financial Accounting
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**Semester 8 - Winter**

ACCT*4230	[0.50]	Advanced Management Accounting
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**Semester 7 or 8 - Fall or Winter**

MGMT*4000	[0.50]	Strategic Management
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Two of:

ACCT*4270	[0.50]	Auditing II
ACCT*4290	[0.50]	IT Auditing and Data Analytics
ACCT*4340	[0.50]	Accounting Theory
ACCT*4350	[0.50]	Income Taxation II
ACCT*4440	[0.50]	Integrated Cases in Accounting
2.50 electives		

Note: ACCT\*4270 and ACCT\*4350 are offered in the Fall only. ACCT\*4290, ACCT\*4340 and ACCT\*4440 are offered in the Winter only. Students may take MGMT\*4000 in either Fall or Winter.

**Food and Agricultural Business (FAB)****Department of Food, Agricultural and Resource Economics, Ontario Agricultural College**

In this major, students will acquire the management education needed to succeed in the dynamic and innovative food and agribusiness industries. Building on an understanding of economic theory and applied methods in both the Canadian and the global context, the program prepares graduates with technical, entrepreneurial and leadership skills for a variety of professional opportunities in industry, government agencies and non-governmental organizations. The major provides a complete foundation for further studies leading to a graduate degree or professional accounting designation.

The major is administered by the Department of Food, Agricultural and Resource Economics in the Ontario Agricultural College and students are urged to consult the faculty advisor.

**Degree Requirements (20.00 Total Credits)**

15.50 - Required Core Courses

1.00 - Restricted Electives (from lists)

1.50 - Liberal Education Electives

2.00 - Free Electives

**Major****Semester 1**

ECON*1050	[0.50]	Introductory Microeconomics
MATH*1030	[0.50]	Business Mathematics
MCS*1000	[0.50]	Introductory Marketing
MGMT*1000	[1.00]	Introduction to Business

**Semester 2**

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
FARE*1400	[1.00]	Economics of the Agri-Food System
0.50 electives or restricted electives		

**Semester 3**

ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2740	[0.50]	Economic Statistics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*2020	[0.50]	Information Management
0.50 electives or restricted electives		

**Semester 4**

ACCT*2230	[0.50]	Management Accounting
ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2770	[0.50]	Introductory Mathematical Economics
FARE*2410	[0.50]	Agri-food Markets and Policy
0.50 electives or restricted electives		

**Semester 5**

ECON*2560	[0.50]	Theory of Finance
ECON*3740	[0.50]	Introduction to Econometrics
FARE*3310	[0.50]	Operations Management
MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management

**Semester 6**

FARE*4240	[0.50]	Futures and Options Markets
2.00 electives or restricted electives		

**Semester 7**

FARE*3030	[0.50]	The Firm and Markets
FARE*4370	[0.50]	Food & Agri Marketing Management
MGMT*4000	[0.50]	Strategic Management

One of:

HROB*3050	[0.50]	Employment Law
MCS*3040	[0.50]	Business and Consumer Law
REAL*4840	[0.50]	Housing and Real Estate Law

0.50 electives or restricted electives

**Semester 8**

AGR*4600	[1.00]	Agriculture and Food Issues Problem Solving
FARE*4000	[0.50]	Agricultural and Food Policy
FARE*4220	[0.50]	Advanced Agribusiness Management

0.50 electives or restricted electives

**Restricted Electives**

A minimum of 1.00 credits from the following list:

FARE*1300	[0.50]	Poverty, Food & Hunger
FARE*2700	[0.50]	Survey of Natural Resource Economics
FARE*3170	[0.50]	Cost-Benefit Analysis
FARE*3250	[0.50]	Food and International Development
FARE*4210	[0.50]	World Agriculture, Food Security and Economic Development
FARE*4290	[0.50]	Land Economics
FARE*4310	[0.50]	Resource Economics
FARE*4360	[0.50]	Marketing Research
FARE*4500	[0.50]	Decision Science
FARE*4550	[0.50]	Independent Studies I
FARE*4560	[0.50]	Independent Studies II

**Food and Agricultural Business (Co-op) (FAB:C)****Department of Food, Agricultural and Resource Economics, Ontario Agricultural College**

A principal aim of the Co-op program in Food and Agricultural Business is to facilitate the transition of students from academic studies to a professional career by enhancing the integration of theory and practice.

The Co-op program in Food and Agricultural Business is a five year program, including 5 work terms. Although the schedule includes 5 work terms, students have the option to complete only 4 of the 5 work terms, but must graduate with a Fall, Winter and Summer work term. Please refer to the Co-operative Education program policy with respect to adjusting the schedule listed below.

Students are eligible to participate in a maximum two (2) summer employment processes and must follow the academic work schedule as outlined on the Co-operative Education and Career Services website: <https://www.recruitguelph.ca/cecs/>.

In order for students to be eligible to continue in the Co-op program, they must meet a minimum 70% cumulative average requirement after second semester, as well as meet all work term requirements. Please refer to the Co-operative Education program policy with respect to work term performance grading and work term report grading.

For additional program information students should consult with their Co-op Co-ordinator and Co-op Faculty Advisor, listed on the Co-operative Education and Career Services web site.

The major is administered by the Department of Food, Agricultural and Resource Economics in the Ontario Agricultural College and students are urged to consult the faculty advisor.

### Degree Requirements (20.00 Total Credits)

15.50 - Required Core Courses

1.00 - Restricted Electives (from lists)

1.50 - Liberal Education Electives

2.00 - Free Electives

### Major

#### Semester 1

ECON*1050	[0.50]	Introductory Microeconomics
MATH*1030	[0.50]	Business Mathematics
MCS*1000	[0.50]	Introductory Marketing
MGMT*1000	[1.00]	Introduction to Business

#### Semester 2

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
FARE*1400	[1.00]	Economics of the Agri-Food System

0.50 electives or restricted electives

#### Semester 3 - Fall

COOP*1100	[0.00]	Introduction to Co-operative Education
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2740	[0.50]	Economic Statistics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*2020	[0.50]	Information Management

0.50 electives or restricted electives

#### Semester 4 - Winter

ACCT*2230	[0.50]	Management Accounting
ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2770	[0.50]	Introductory Mathematical Economics
FARE*2410	[0.50]	Agri-food Markets and Policy

0.50 electives or restricted electives

#### Summer Semester

COOP*1000	[0.00]	Co-op Work Term I
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#### Fall Semester

COOP*2000	[0.00]	Co-op Work Term II
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(Eight month work term Summer/Fall)

#### Semester 5 - Winter

ECON*2560	[0.50]	Theory of Finance
ECON*3740	[0.50]	Introduction to Econometrics
FARE*3310	[0.50]	Operations Management
FARE*4240	[0.50]	Futures and Options Markets
MGMT*3320	[0.50]	Financial Management

#### Summer Semester

COOP*3000	[0.00]	Co-op Work Term III
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#### Semester 6 - Fall

MGMT*3020	[0.50]	Corporate Social Responsibility
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2.00 electives or restricted electives

#### Winter Semester

COOP*4000	[0.00]	Co-op Work Term IV
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(Eight month work term in conjunction with COOP\*5000)

#### Summer Semester

COOP*5000	[0.00]	Co-op Work Term V
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(Eight month work term in conjunction with COOP\*4000)

#### Semester 7 - Fall

FARE*3030	[0.50]	The Firm and Markets
FARE*4370	[0.50]	Food & Agri Marketing Management
MGMT*4000	[0.50]	Strategic Management

One of:

HROB*3050	[0.50]	Employment Law
MCS*3040	[0.50]	Business and Consumer Law
REAL*4840	[0.50]	Housing and Real Estate Law

0.50 electives or restricted electives

#### Semester 8 - Winter

AGR*4600	[1.00]	Agriculture and Food Issues Problem Solving
FARE*4000	[0.50]	Agricultural and Food Policy
FARE*4220	[0.50]	Advanced Agribusiness Management

0.50 electives or restricted electives

#### Restricted Electives

A minimum of 1.00 credits from the following list:

FARE*1300	[0.50]	Poverty, Food & Hunger
FARE*2700	[0.50]	Survey of Natural Resource Economics
FARE*3170	[0.50]	Cost-Benefit Analysis
FARE*3250	[0.50]	Food and International Development
FARE*4210	[0.50]	World Agriculture, Food Security and Economic Development
FARE*4290	[0.50]	Land Economics
FARE*4310	[0.50]	Resource Economics
FARE*4360	[0.50]	Marketing Research
FARE*4500	[0.50]	Decision Science
FARE*4550	[0.50]	Independent Studies I
FARE*4560	[0.50]	Independent Studies II

### Hospitality and Tourism Management (HTM)

#### School of Hospitality, Food and Tourism Management, College of Business and Economics

The Hospitality and Tourism Management (HTM) major prepares students to assume positions of responsibility within the world's largest industry.

In the first two years of study, students are introduced to foundational business skills and knowledge; and provided with an in-depth overview of the industry's three sectors: hotel and lodging; restaurant and foodservice; and tourism.

By the end of the second year, students must choose one of those sectors as their area of emphasis. For the remainder of the program, the courses and learning opportunities that students encounter have one goal: to help them cultivate the knowledge, skills and understanding required of a managerial leader in their chosen area.

Topics of study for all three areas of emphasis includes:

- human resources management;
- marketing;
- accounting;
- communications

The hotel and lodging area includes:

- operations;
- event management;
- design

The restaurant and foodservice area includes:

- food systems;
- restaurant management;
- beverage management

The tourism area includes:

- planning and development;
- sustainability;
- international tourism

An integral part of the HTM major is experiential learning, which means that theory is balanced with practice. Students are encouraged to participate in guided learning opportunities outside the conventional classroom, such as independent study courses, study abroad, and numerous networking events with industry leaders.

#### Additional information:

- 1200 hours of verified work experience in the hospitality and tourism industry is required for students to be eligible for graduation.
- 700 hours of hospitality and tourism work experience must be completed before a student enters Semester 7.

Elective options enable students to select courses that support or complement their area of emphasis. Examples:



1. Students may use a combination of courses from their major, liberal education and free electives to earn the Certificate in Leadership. For information about this certificate and its course requirements, see <http://www.leadershipcertificate.com/>
2. Students interested in languages and/or participating in study abroad programs may use a combination of their liberal education or free electives to study one or more of the various languages taught at the University or to take courses while abroad.
3. Students interested in independent study courses (e.g. HTM\*4130, HTM\*4140, HTM\*4150, HTM\*4500) may use a combination of their restricted or free electives to study one or more of these special topic courses. For more information regarding current offerings, students should consult the Faculty Advisor.

### Degree Requirements (20.00 Total Credits)

13.50 - Required Core Courses

3.50 - Area of Emphasis (Restricted Electives)

1.50 - Liberal Education Electives

1.50 - Free Electives

### Major

#### Semester 1

ECON*1050	[0.50]	Introductory Microeconomics
HTM*1700	[0.50]	Foodservice Management
MCS*1000	[0.50]	Introductory Marketing
MGMT*1000	[1.00]	Introduction to Business

#### Semester 2

ECON*1100	[0.50]	Introductory Macroeconomics
HTM*1160	[0.50]	Lodging Operations
MATH*1030	[0.50]	Business Mathematics

1.00 electives or areas of emphasis

#### Semester 3

ACCT*1220	[0.50]	Introductory Financial Accounting
HTM*1070	[0.50]	Responsible Tourism Policy and Planning

One of:

ECON*2740	[0.50]	Economic Statistics
STAT*2060	[0.50]	Statistics for Business Decisions

#### Semester 4

ACCT*2230	[0.50]	Management Accounting
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#### Semester 3 or 4

HROB*2090	[0.50]	Individuals and Groups in Organizations
HTM*2010	[0.50]	Hospitality and Tourism Business Communications
HTM*2030	[0.50]	Control Systems in the Hospitality Industry
MCS*2020	[0.50]	Information Management

1.00 electives or areas of emphasis

#### Semester 5 or 6

ECON*2560	[0.50]	Theory of Finance
HROB*3100	[0.50]	Developing Management and Leadership Competencies
HTM*3080	[0.50]	Marketing Strategy for Hospitality Managers
HTM*3120	[0.50]	Service Operations Analysis
MCS*3040	[0.50]	Business and Consumer Law
MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management

1.50 electives or areas of emphasis

#### Semester 7 or 8

HTM*4080	[0.50]	Experiential Learning and Leadership in the Hospitality and Tourism Industry
HTM*4190	[0.50]	Hospitality and Tourism Industry Consultation
HTM*4250	[0.50]	Hospitality Revenue Management
MGMT*4000	[0.50]	Strategic Management

3.00 electives or areas of emphasis

### Areas of Emphasis

Students in the Hospitality and Tourism Management (HTM) major choose one of the three areas of emphasis: Hotel and Lodging; Restaurant and Foodservice; or Tourism. Students should declare an area of emphasis by semester 4 in order to facilitate course selection for their chosen area. See the HTM Academic Advisor to declare your area of emphasis.

#### Hotel and Lodging

##### Semester 4, 6 or 8

HTM*2070	[0.50]	Event Management
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##### Semester 5 or 7

HTM*3060	[0.50]	Lodging Management
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##### Semester 7

HTM*4090	[0.50]	Hospitality Development, Design and Sustainability
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##### Semester 8

HTM*4060	[0.50]	Advanced Lodging Management
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1.50 credits of:

ECON*2200	[0.50]	Industrial Relations
EDRD*3160	[0.50]	International Communication
FARE*4360	[0.50]	Marketing Research
HTM*3160	[0.50]	Destination Management and Marketing
HTM*3180	[0.50]	Casino Operations Management
MGMT*4260	[0.50]	International Business
REAL*1820	[0.50]	Real Estate and Housing
REAL*2820	[0.50]	Real Estate Finance
REAL*3810	[0.50]	Real Estate Market Analysis
REAL*3890	[0.50]	Property Management
REAL*4820	[0.50]	Real Estate Appraisal
REAL*4840	[0.50]	Housing and Real Estate Law

### Restaurant and Foodservice

#### Semester 5 or 6

HTM*2700	[0.50]	Understanding Foods
HTM*3090	[1.00]	Restaurant Operations Management

#### Semester 8

HTM*4110	[0.50]	Advanced Restaurant Operations
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1.50 credits of:

FOOD*3700	[0.50]	Sensory Evaluation of Foods
HROB*3010	[0.50]	Managing and Rewarding Performance
HROB*3070	[0.50]	Attracting and Acquiring Talent
HROB*3090	[0.50]	Developing Talent
HROB*4060	[0.50]	Workforce Optimization
HTM*2070	[0.50]	Event Management
HTM*2740	[0.50]	Cultural Aspects of Food
HTM*3030	[0.50]	Beverage Management
HTM*3780	[0.50]	Managing Food in Canada
HTM*4050	[0.50]	Wine and Oenology
MCS*3010	[0.50]	Quality Management
NUTR*1010	[0.50]	Introduction to Nutrition

### Tourism

#### Semester 6

GEOG*3490	[0.50]	Tourism and Environment
HTM*3160	[0.50]	Destination Management and Marketing

#### Semester 8

FARE*4360	[0.50]	Marketing Research
HTM*4170	[0.50]	International Tourism

1.50 credits of:

ECON*2100	[0.50]	Economic Growth and Environmental Quality
ECON*2650	[0.50]	Introductory Development Economics
ECON*4830	[0.50]	Economic Development
EDRD*3400	[0.50]	Sustainable Communities
EDRD*3500	[0.50]	Recreation and Tourism Planning
EDRD*4010	[0.50]	Tourism Planning in the Less Developed World
GEOG*1220	[0.50]	Human Impact on the Environment
GEOG*2210	[0.50]	Environment and Resources
HTM*2070	[0.50]	Event Management
HTM*3180	[0.50]	Casino Operations Management
LARC*2820	[0.50]	Urban and Regional Planning
MCS*3030	[0.50]	Research Methods

### Hospitality and Tourism Management Co-op (HTM:C)

#### School of Hospitality, Food and Tourism Management, College of Business and Economics

The principal aim of the Hospitality and Tourism Management Co-op program is to facilitate the transition of students from academic studies to a professional work life by enhancing the integration of theory and practice. The focus on experiential learning means that theory is balanced with practice. Students are encouraged to participate in guided learning opportunities outside the conventional classroom, such as independent study courses, study abroad and numerous networking events with industry leaders. Team work is a significant part of the core courses.

The co-op work term portion of the program consists of one twelve-month period, which begins at the end of the second year in May and extends to April of the following year. The Co-op Program is completed over a five-year period.

Elective options enable students to select courses that support or complement their primary field of study. Examples:

- 1) Students may use a combination of courses from their major, liberal education and free electives to earn the Certificate in Leadership. For information about this certificate and its course requirements, see <http://www.leadershipcertificate.com/>
- 2) Students interested in languages and/or participating in study abroad programs may use a combination of their liberal education or free electives to study one or more of the various languages taught at the University or to take courses while abroad.

3) Students interested in independent study courses (e.g. HTM\*4500, HTM\*4130, HTM\*4140, HTM\*4150) may use a combination of their restricted or free electives to study one or more of these special topic courses. For more information regarding current offerings, students should consult the Faculty Advisor.

### Degree Requirements (20.00 Total Credits)

13.50 - Required Core Courses

3.50 - Area of Emphasis (Restricted Electives)

1.50 - Liberal Education Electives

1.50 - Free Electives

### Major

#### Semester - Fall

ECON*1050	[0.50]	Introductory Microeconomics
HTM*1700	[0.50]	Foodservice Management
MCS*1000	[0.50]	Introductory Marketing
MGMT*1000	[1.00]	Introduction to Business

#### Semester 2 - Winter

ECON*1100	[0.50]	Introductory Macroeconomics
HTM*1160	[0.50]	Lodging Operations
MATH*1030	[0.50]	Business Mathematics

1.00 electives or areas of emphasis

#### Semester 3 - Fall

ACCT*1220	[0.50]	Introductory Financial Accounting
COOP*1100	[0.00]	Introduction to Co-operative Education
HTM*1070	[0.50]	Responsible Tourism Policy and Planning

One of:

ECON*2740	[0.50]	Economic Statistics
STAT*2060	[0.50]	Statistics for Business Decisions

#### Semester 4 - Winter

ACCT*2230	[0.50]	Management Accounting
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#### Semester 3 or 4 - Fall or Winter

HROB*2090	[0.50]	Individuals and Groups in Organizations
HTM*2010	[0.50]	Hospitality and Tourism Business Communications
HTM*2030	[0.50]	Control Systems in the Hospitality Industry
MCS*2020	[0.50]	Information Management

1.00 electives or areas of emphasis

#### Summer Semester

COOP*1000	[0.00]	Co-op Work Term I
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#### Fall Semester

COOP*2000	[0.00]	Co-op Work Term II
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#### Winter Semester

COOP*3000	[0.00]	Co-op Work Term III
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#### Semester 5 or 6 - Fall or Winter

ECON*2560	[0.50]	Theory of Finance
HROB*3100	[0.50]	Developing Management and Leadership Competencies
HTM*3080	[0.50]	Marketing Strategy for Hospitality Managers
HTM*3120	[0.50]	Service Operations Analysis
MCS*3040	[0.50]	Business and Consumer Law
MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management

1.50 electives or areas of emphasis

#### Semester 7 or 8 - Fall or Winter

HTM*4080	[0.50]	Experiential Learning and Leadership in the Hospitality and Tourism Industry
HTM*4190	[0.50]	Hospitality and Tourism Industry Consultation
HTM*4250	[0.50]	Hospitality Revenue Management
MGMT*4000	[0.50]	Strategic Management

3.00 electives or areas of emphasis

### Areas of Emphasis

Students in the Hospitality and Tourism Management (HTM) major choose one of the three areas of emphasis: Hotel and Lodging; Restaurant and Foodservice; or Tourism. Students should declare an area of emphasis by semester 4 in order to facilitate course selection for their chosen area. See the HTM Academic Advisor to declare your area of emphasis.

#### Hotel and Lodging

##### Semester 4, 6 or 8 - Winter

HTM*2070	[0.50]	Event Management
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##### Semester 5 or 7 - Fall

HTM*3060	[0.50]	Lodging Management
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##### Semester 7 - Fall

HTM*4090	[0.50]	Hospitality Development, Design and Sustainability
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#### Semester 8 - Winter

HTM*4060	[0.50]	Advanced Lodging Management
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1.50 credits of:

ECON*2200	[0.50]	Industrial Relations
EDRD*3160	[0.50]	International Communication
FARE*4360	[0.50]	Marketing Research
HTM*3160	[0.50]	Destination Management and Marketing
HTM*3180	[0.50]	Casino Operations Management
MGMT*4260	[0.50]	International Business
REAL*1820	[0.50]	Real Estate and Housing
REAL*2820	[0.50]	Real Estate Finance
REAL*3810	[0.50]	Real Estate Market Analysis
REAL*3890	[0.50]	Property Management
REAL*4820	[0.50]	Real Estate Appraisal
REAL*4840	[0.50]	Housing and Real Estate Law

#### Restaurant and Foodservice

##### Semester 5 or 6 - Fall or Winter

HTM*2700	[0.50]	Understanding Foods
HTM*3090	[1.00]	Restaurant Operations Management

#### Semester 8 - Winter

HTM*4110	[0.50]	Advanced Restaurant Operations
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1.50 credits of:

FOOD*3700	[0.50]	Sensory Evaluation of Foods
HROB*3010	[0.50]	Managing and Rewarding Performance
HROB*3070	[0.50]	Attracting and Acquiring Talent
HROB*3090	[0.50]	Developing Talent
HROB*4060	[0.50]	Workforce Optimization
HTM*2070	[0.50]	Event Management
HTM*2740	[0.50]	Cultural Aspects of Food
HTM*3030	[0.50]	Beverage Management
HTM*3780	[0.50]	Managing Food in Canada
HTM*4050	[0.50]	Wine and Oenology
MCS*3010	[0.50]	Quality Management
NUTR*1010	[0.50]	Introduction to Nutrition

#### Tourism

##### Semester 6 - Winter

GEOG*3490	[0.50]	Tourism and Environment
HTM*3160	[0.50]	Destination Management and Marketing

##### Semester 8 - Winter

FARE*4360	[0.50]	Marketing Research
HTM*4170	[0.50]	International Tourism

1.50 credits of:

ECON*2100	[0.50]	Economic Growth and Environmental Quality
ECON*2650	[0.50]	Introductory Development Economics
ECON*4830	[0.50]	Economic Development
EDRD*3400	[0.50]	Sustainable Communities
EDRD*3500	[0.50]	Recreation and Tourism Planning
EDRD*4010	[0.50]	Tourism Planning in the Less Developed World
GEOG*1220	[0.50]	Human Impact on the Environment
GEOG*2210	[0.50]	Environment and Resources
HTM*2070	[0.50]	Event Management
HTM*3180	[0.50]	Casino Operations Management
LARC*2820	[0.50]	Urban and Regional Planning
MCS*3030	[0.50]	Research Methods

### Leadership and Organizational Management (LOM)

#### Department of Management, College of Business and Economics

The major in Leadership and Organizational Management provides a balanced foundation of management knowledge and strategic leadership competencies that will enable graduates to one day work as professional managers and organizational leaders. Courses extend beyond the traditional lecture based format to include community based group projects, guest lecturers, in-class simulations and case-based learning to help link academic expertise and theory with industry practice. Experiential learning is an integral part of the major, and occurs through the integration of industry examples in the classroom, and a required course in evidence-based management, in which students conduct research in organizations under the direction of a faculty member. Our faculty are highly skilled and committed educators who encourage students to become actively involved in their own education, both within and outside the classroom. In addition, the Leadership and Organizational Management Student Association (LOMSA) is active in providing access to professional associations, networking opportunities with industry professionals, leadership conferences, guest speakers and social events to help students build relationships with other students, faculty, and the business community.

Graduates of the Leadership and Organizational Management major will leave the University of Guelph equipped with a range of knowledge and competencies that prepare them to meet the leadership and management needs of the future in such roles as management consultant, human resource practitioner, talent management specialist or as future general managers. Successful completion of the courses within the Leadership and Organizational Management may qualify graduates for potential certification by the Human Resources Professionals Association (HRPA) as a Certified Human Resources Professional (CHRP).

### Degree Requirements (20.00 Total Credits)

14.50 - Required Core Courses

1.50 - Liberal Education Electives

4.00 - Free Electives

The recommended program sequence is outlined below.

#### Major

##### Semester 1

ECON*1050	[0.50]	Introductory Microeconomics
MCS*1000	[0.50]	Introductory Marketing
MGMT*1000	[1.00]	Introduction to Business

0.50 electives

##### Semester 2

ECON*1100	[0.50]	Introductory Macroeconomics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MATH*1030	[0.50]	Business Mathematics

1.00 electives

##### Semester 3

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*2200	[0.50]	Industrial Relations
HROB*2010	[0.50]	Foundations of Leadership

One of:

ECON*2740	[0.50]	Economic Statistics
STAT*2060	[0.50]	Statistics for Business Decisions

0.50 electives

##### Semester 4

ACCT*2230	[0.50]	Management Accounting
HROB*2290	[0.50]	Human Resources Management
MCS*2020	[0.50]	Information Management

1.00 electives

##### Semester 5

ECON*2560	[0.50]	Theory of Finance
HROB*3010	[0.50]	Managing and Rewarding Performance
HROB*3050	[0.50]	Employment Law
HROB*3070	[0.50]	Attracting and Acquiring Talent

0.50 electives

##### Semester 6

HROB*3030	[0.50]	Workplace Health and Safety
HROB*3090	[0.50]	Developing Talent
HROB*3100	[0.50]	Developing Management and Leadership Competencies
FARE*3310	[0.50]	Operations Management
MGMT*3320	[0.50]	Financial Management

##### Semester 7

HROB*4100	[1.00]	Evidence-Based People Management
MGMT*4000	[0.50]	Strategic Management

1.00 electives

##### Semester 8

HROB*4000	[0.50]	Leadership and Organizational Management Capstone
HROB*4060	[0.50]	Workforce Optimization
MGMT*3020	[0.50]	Corporate Social Responsibility

1.00 electives

### Management Economics and Finance (MEF)

#### Department of Economics and Finance, College of Business and Economics

The Management Economics and Finance major is designed to offer students an appreciation of business and economic problems particularly in the area of finance.

The major provides a suitable education for a career in the business world or in the public service. It also constitutes a useful preparation for more advanced studies, including graduate studies in Economics, Finance, Business Administration, Accounting, Industrial Relations, Law, and Public Policy. The major is administered by the [Department of Economics and Finance](#) and students are urged to consult the faculty advisor.

### Degree Requirements (20.00 Total Credits)

11.00 - Required Core Courses

5.50 - Restricted Electives (from lists)

1.50 - Liberal Education Electives

2.00 - Free Electives

#### Major

##### Semester 1

ECON*1050	[0.50]	Introductory Microeconomics
MGMT*1000	[1.00]	Introduction to Business

One of:

MATH*1030	[0.50]	Business Mathematics
MATH*1200	[0.50]	Calculus I

0.50 electives

\*Note: MATH\*1200 is recommended for the Finance Area of Emphasis.

##### Semester 2

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*1000	[0.50]	Introductory Marketing

0.50 electives

##### Semester 3

ACCT*2230	[0.50]	Management Accounting
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2740	[0.50]	Economic Statistics
ECON*2770	[0.50]	Introductory Mathematical Economics
MCS*2020	[0.50]	Information Management

Note: Students who wish to take the Statistics courses listed under the Finance Area of Emphasis may select STAT\*2040 in place of ECON\*2740.

##### Semester 4

ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2560	[0.50]	Theory of Finance
MCS*3040	[0.50]	Business and Consumer Law **
MGMT*3320	[0.50]	Financial Management

0.50 electives or restricted electives in an area of emphasis

\*Note: Students may select HROB\*3050 or REAL\*4840 in place of MCS\*3040. Both are Fall semester courses and can be completed in any Fall semester, provided the prerequisites are completed.

##### Semester 5

ECON*3740	[0.50]	Introduction to Econometrics
MGMT*3020	[0.50]	Corporate Social Responsibility

1.50 electives or restricted electives

Note: ECON\*3710 is required for the Finance Area of Emphasis.

##### Semester 6

FARE*3310	[0.50]	Operations Management
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2.00 electives or restricted electives

Note: One of ECON\*3100 or ECON\*3810 is required for the Finance Area of Emphasis

##### Semester 7

2.50 electives or restricted electives

##### Semester 8

MGMT*4000	[0.50]	Strategic Management
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One of:

ECON*4400	[0.50]	Economics of Organizations and Corporate Governance
ECON*4780	[0.50]	Topics in Industrial Organization
ECON*4800	[0.50]	Competitiveness and Strategic Advantage

1.50 electives or restricted electives

#### Areas of Emphasis

Students choose either Finance or Management as an area of emphasis in the MEF major. This choice should be made by semester 6. See the Economics and Finance departmental advisor to declare an area of emphasis.

#### FINANCE Area of Emphasis

ECON*3710	[0.50]	Advanced Microeconomics
ECON*4560	[0.50]	Advanced Topics in Finance

1.50 credits from the following Finance courses:

ECON*3360	[0.50]	The Strategy of Mergers and Acquisitions
ECON*3660	[0.50]	Economics of Equity Markets
ECON*3760	[0.50]	Fundamentals of Derivatives **
ECON*3860	[0.50]	International Finance
ECON*3960	[0.50]	Money, Credit and the Financial System

\*\* Note that FARE\*4240 may be substituted for this course.

One of:

ECON*3100	[0.50]	Game Theory
ECON*3810	[0.50]	Advanced Macroeconomics
ECON*4700	[0.50]	Advanced Mathematical Economics

1.00 Economics credits at the 3000 or 4000 level

In addition to the required credits listed above, students must take a minimum of 1.5 credits in restricted electives. Restricted electives are listed below and have been grouped in major topical areas which are related to, or are an extension of, the professional interests

of the major. Students may, however, choose restricted electives from any of those listed without regard to the categories, which are intended to be suggestive.

#### Courses toward a professional designation as a Chartered Financial Analyst (CFA)

ACCT*3330	[0.50]	Intermediate Financial Accounting I
ACCT*3340	[0.50]	Intermediate Financial Accounting II
ECON*3660	[0.50]	Economics of Equity Markets
ECON*3760	[0.50]	Fundamentals of Derivatives
ECON*4660	[0.50]	Risk Management in Finance and Insurance
ECON*4760	[0.50]	Topics in Monetary Economics
MGMT*4350	[0.50]	Business Case Competition Preparation

#### Courses in Quantitative Finance

ECON*4640	[0.50]	Applied Econometrics I
ECON*4840	[0.50]	Applied Econometrics II
MATH*1160	[0.50]	Linear Algebra I
STAT*3100	[0.50]	Introductory Mathematical Statistics I
STAT*3110	[0.50]	Introductory Mathematical Statistics II

#### Courses in preparation for post-graduate work in Economics (MA)

ECON*4640	[0.50]	Applied Econometrics I
ECON*4710	[0.50]	Advanced Topics in Microeconomics
ECON*4810	[0.50]	Advanced Topics in Macroeconomics

#### MANAGEMENT Area of Emphasis

1.50 credits from the following Finance courses:

ECON*3360	[0.50]	The Strategy of Mergers and Acquisitions
ECON*3660	[0.50]	Economics of Equity Markets
ECON*3760	[0.50]	Fundamentals of Derivatives **
ECON*3860	[0.50]	International Finance
ECON*3960	[0.50]	Money, Credit and the Financial System

\*\* Note that FARE\*4240 may be substituted for this course.

2.50 additional credits in economics of which at least 0.50 must be at the 4000 level and at most 0.50\*\*\* may be at the 2000 level.

\*\*\* May be replaced with a 4000 level 0.50 credits in Accounting.

In addition to the economics credits listed above, students must take a minimum of 1.50 credits in restricted electives listed below. These courses have been grouped in major topical areas which are related to various professional interests. Students may, however, choose restricted electives from any of those listed without regard to the categories.

#### Courses toward a professional accounting designation Chartered Professional Accountants (CPA)

See <http://www.business.uoguelph.ca/accounting.shtml> for additional information.

ACCT*3230	[0.50]	Intermediate Management Accounting
ACCT*3280	[0.50]	Auditing I
ACCT*3330	[0.50]	Intermediate Financial Accounting I
ACCT*3340	[0.50]	Intermediate Financial Accounting II
ACCT*3350	[0.50]	Taxation
ACCT*4220	[0.50]	Advanced Financial Accounting
ACCT*4230	[0.50]	Advanced Management Accounting
ACCT*4270	[0.50]	Auditing II
ACCT*4290	[0.50]	IT Auditing and Data Analytics
ACCT*4340	[0.50]	Accounting Theory
ACCT*4350	[0.50]	Income Taxation II
ACCT*4440	[0.50]	Integrated Cases in Accounting

#### Courses to prepare for the Certified Human Resource Professional (CHRP) designation:

(see <http://www.uoguelph.ca/business/academic-advisor-careers-chrp.shtml> for more information)

ECON*2200	[0.50]	Industrial Relations
HROB*3010	[0.50]	Managing and Rewarding Performance
HROB*3030	[0.50]	Workplace Health and Safety
HROB*3070	[0.50]	Attracting and Acquiring Talent
HROB*3090	[0.50]	Developing Talent
HROB*4060	[0.50]	Workforce Optimization

#### Courses to prepare for a post-graduate program in Industrial Relations:

ECON*2200	[0.50]	Industrial Relations
ECON*3400	[0.50]	The Economics of Personnel Management
ECON*3520	[0.50]	Labour Economics
ECON*3620	[0.50]	International Trade
ECON*4790	[0.50]	Topics in Labour Market Theory
HROB*3010	[0.50]	Managing and Rewarding Performance
HROB*3030	[0.50]	Workplace Health and Safety
HROB*3070	[0.50]	Attracting and Acquiring Talent
HROB*3090	[0.50]	Developing Talent
HROB*4060	[0.50]	Workforce Optimization

#### Courses toward the Leadership Certificate:

(see <http://www.leadershipcertificate.com/> for more information)

HROB*2010	[0.50]	Foundations of Leadership
HROB*4010	[0.50]	Leadership Certificate Capstone

HROB*4030	[0.50]	Advanced Topics In Leadership and Organizational Management
HROB*4100	[1.00]	Evidence-Based People Management
POLS*2250	[0.50]	Public Administration and Governance
POLS*3440	[0.50]	Corruption, Scandal and Political Ethics

#### Courses in Public Administration:

ECON*3610	[0.50]	Public Economics
POLS*2250	[0.50]	Public Administration and Governance
POLS*2300	[0.50]	Canadian Government and Politics
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3250	[0.50]	Public Policy: Challenges and Prospects
POLS*3270	[0.50]	Local Government in Ontario
POLS*3470	[0.50]	Business-Government Relations in Canada

#### Courses in Real Estate and Housing:

ECON*3500	[0.50]	Urban Economics **
REAL*1820	[0.50]	Real Estate and Housing
REAL*2820	[0.50]	Real Estate Finance
REAL*3890	[0.50]	Property Management
REAL*4820	[0.50]	Real Estate Appraisal **

\*\* These courses count towards the Post Graduate Valuation Certificate offered by UBC, part of the requirements to obtain an Accredited Appraiser Canadian Institute designation

#### Courses in Corporate Social Responsibility:

BUS*4550	[0.50]	Applied Business Project I
BUS*4560	[0.50]	Applied Business Project II
ECON*2650	[0.50]	Introductory Development Economics
ECON*3300	[0.50]	Economics of Health and the Workplace
ECON*4930	[0.50]	Environmental Economics
HROB*3030	[0.50]	Workplace Health and Safety
REAL*2850	[0.50]	Service Learning in Housing
MGMT*4050	[0.50]	Business Consulting
MGMT*4060	[0.50]	Business Consulting

#### Courses in Marketing:

MCS*2600	[0.50]	Fundamentals of Consumer Behaviour
MCS*3000	[0.50]	Advanced Marketing
MCS*3010	[0.50]	Quality Management
MCS*3620	[0.50]	Marketing Communications
MCS*4400	[0.50]	Pricing Management

#### Courses in Food and Agribusiness:

FARE*2410	[0.50]	Agri-food Markets and Policy
FARE*3030	[0.50]	The Firm and Markets
FARE*3170	[0.50]	Cost-Benefit Analysis
FARE*4000	[0.50]	Agricultural and Food Policy
FARE*4220	[0.50]	Advanced Agribusiness Management

### Management Economics and Finance (Co-op) (MEF:C)

#### Department of Economics and Finance, College of Business and Economics

A principal aim of the Co-op program in Management Economics and Finance is to facilitate the transition of students from academic studies to a professional career by enhancing the integration of theory and practice.

The Co-op program in Management Economics and Finance is a five year program including, 5 work terms. Although the schedule includes 5 work terms, students have the option to complete only 4 of the 5 work terms, but must graduate with a Fall, Winter, and Summer work term.

Students are eligible to participate in a maximum two (2) summer employment processes and must follow the academic work schedule as outlined on the Co-operative Education and Career Services website: <https://www.recrutguelp.ca/cecs/>. Please refer to the Co-operative Education program policy with respect to adjusting the schedule listed below.

In order for students to be eligible to continue in the Co-op program, they must meet a minimum 70% cumulative average requirement after second semester, as well as meet all work term requirements. Please refer to the Co-operative Education program policy with respect to work term performance grading and work term report grading.

For additional program information students should consult with their Co-op coordinator and Co-op Faculty Advisor, listed on the Co-operative Education and Career Services web site.

#### Degree Requirements (20.00 Total Credits)

11.00 - Required Core Courses

5.50 - Restricted Electives (from lists)

1.50 - Liberal Education Electives

2.00 - Free Electives

#### Major

##### Semester 1 - Fall

ECON*1050	[0.50]	Introductory Microeconomics
MGMT*1000	[1.00]	Introduction to Business
One of:		

MATH*1030	[0.50]	Business Mathematics
MATH*1200	[0.50]	Calculus I

0.50 electives

\*Note: MATH\*1200 is recommended for the Finance Area of Emphasis.

**Semester 2 - Winter**

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*1000	[0.50]	Introductory Marketing

0.50 electives

**Semester 3 - Fall**

ACCT*2230	[0.50]	Management Accounting
COOP*1100	[0.00]	Introduction to Co-operative Education
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2740	[0.50]	Economic Statistics
ECON*2770	[0.50]	Introductory Mathematical Economics
MCS*2020	[0.50]	Information Management

\*Note: Students who wish to take the Statistics courses listed under the Finance Area of Emphasis may select STAT\*2040 in place of ECON\*2740.

**Semester 4 - Winter**

ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2560	[0.50]	Theory of Finance
MCS*3040	[0.50]	Business and Consumer Law *
MGMT*3320	[0.50]	Financial Management

0.50 electives or restricted electives in an area of emphasis

\* Note: Students may select HROB\*3050 or REAL\*4840 in place of MCS\*3040. Both are Fall semester courses and can be completed in any Fall semester, provided the prerequisites are completed.

**Summer Semester**

COOP*1000	[0.00]	Co-op Work Term I
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**Fall Semester**

COOP*2000	[0.00]	Co-op Work Term II
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**Semester 5 - Winter**

ECON*3740	[0.50]	Introduction to Econometrics
FARE*3310	[0.50]	Operations Management

1.50 electives or restricted electives

\*Note: One of ECON\*3100 or ECON\*3810 is required for the Finance Area of Emphasis

**Summer Semester**

COOP*3000	[0.00]	Co-op Work Term III
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**Semester 6 - Fall**

MGMT*3020	[0.50]	Corporate Social Responsibility
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2.00 electives or restricted electives

\*Note: If in the Finance Area of Emphasis take ECON\*3710.

**Winter Semester**

COOP*4000	[0.00]	Co-op Work Term IV (Eight month work term in conjunction with COOP*5000)
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**Summer Semester**

COOP*5000	[0.00]	Co-op Work Term V (Eight month work term in conjunction with COOP*4000)
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**Semester 7 - Fall**

2.50 electives or restricted electives

**Semester 8 - Winter**

MGMT*4000	[0.50]	Strategic Management
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One of:

ECON*4400	[0.50]	Economics of Organizations and Corporate Governance
ECON*4780	[0.50]	Topics in Industrial Organization
ECON*4800	[0.50]	Competitiveness and Strategic Advantage

1.50 electives or restricted electives

**Areas of Emphasis**

Students choose either Finance or Management as an area of emphasis in the MEF major. This choice should be made by semester 6. See the Economics and Finance departmental advisor to declare an area of emphasis.

**FINANCE Area of Emphasis**

ECON*3710	[0.50]	Advanced Microeconomics
ECON*4560	[0.50]	Advanced Topics in Finance

1.50 credits from the following Finance courses:

ECON*3360	[0.50]	The Strategy of Mergers and Acquisitions
ECON*3660	[0.50]	Economics of Equity Markets
ECON*3760	[0.50]	Fundamentals of Derivatives **
ECON*3860	[0.50]	International Finance
ECON*3960	[0.50]	Money, Credit and the Financial System

\*\* Note that FARE\*4240 may be substituted for this course.

One of:

ECON*3100	[0.50]	Game Theory
ECON*3810	[0.50]	Advanced Macroeconomics
ECON*4700	[0.50]	Advanced Mathematical Economics

1.00 Economics credits at the 3000 or 4000 level

In addition to the required credits listed above, students must take a minimum of 1.50 credits in restricted electives. Restricted electives are listed below and have been grouped in major topical areas which are related to, or are an extension of, the professional interests of the major. Students may, however, choose restricted electives from any of those listed without regard to the categories, which are intended to be suggestive.

**Courses toward a professional designation as a Chartered Financial Analyst (CFA):**

ACCT*3330	[0.50]	Intermediate Financial Accounting I
ACCT*3340	[0.50]	Intermediate Financial Accounting II
ECON*3660	[0.50]	Economics of Equity Markets
ECON*3760	[0.50]	Fundamentals of Derivatives
ECON*4660	[0.50]	Risk Management in Finance and Insurance
ECON*4760	[0.50]	Topics in Monetary Economics
MGMT*4350	[0.50]	Business Case Competition Preparation

**Courses in Quantitative Finance:**

ECON*4640	[0.50]	Applied Econometrics I
ECON*4840	[0.50]	Applied Econometrics II
MATH*1160	[0.50]	Linear Algebra I
STAT*3100	[0.50]	Introductory Mathematical Statistics I
STAT*3110	[0.50]	Introductory Mathematical Statistics II

**Courses in preparation for post-graduate work in Economics (MA):**

ECON*4640	[0.50]	Applied Econometrics I
ECON*4710	[0.50]	Advanced Topics in Microeconomics
ECON*4810	[0.50]	Advanced Topics in Macroeconomics

**MANAGEMENT Area of Emphasis**

1.50 credits from the following Finance courses:

ECON*3360	[0.50]	The Strategy of Mergers and Acquisitions
ECON*3660	[0.50]	Economics of Equity Markets
ECON*3760	[0.50]	Fundamentals of Derivatives **
ECON*3860	[0.50]	International Finance
ECON*3960	[0.50]	Money, Credit and the Financial System

\*\* Note that FARE\*4240 may be substituted for this course.

2.50 additional credits in economics of which at least 0.50 must be at the 4000 level and at most 0.50\*\* may be at the 2000 level.

\*\* May be replaced with a 4000 level 0.50 credits in Accounting.

In addition to the economics credits listed above, students must take a minimum of 1.50 credits in restricted electives listed below. These courses have been grouped in major topical areas which are related to various professional interests. Students may, however, choose restricted electives from any of those listed without regard to the categories.

**Courses toward a professional accounting designation Chartered Professional Accountants (CPA)**See <http://www.business.uoguelph.ca/accounting.shtml> for additional information.

ACCT*3230	[0.50]	Intermediate Management Accounting
ACCT*3280	[0.50]	Auditing I
ACCT*3330	[0.50]	Intermediate Financial Accounting I
ACCT*3340	[0.50]	Intermediate Financial Accounting II
ACCT*3350	[0.50]	Taxation
ACCT*4220	[0.50]	Advanced Financial Accounting
ACCT*4230	[0.50]	Advanced Management Accounting
ACCT*4270	[0.50]	Auditing II
ACCT*4290	[0.50]	IT Auditing and Data Analytics
ACCT*4340	[0.50]	Accounting Theory
ACCT*4350	[0.50]	Income Taxation II
ACCT*4230	[0.50]	Advanced Management Accounting
ACCT*4440	[0.50]	Integrated Cases in Accounting

**Courses to prepare for the Certified Human Resource Professional (CHRP) designation:**(see <http://www.uoguelph.ca/business/academic-advisor-careers-chrp.shtml> for more information)

ECON*2200	[0.50]	Industrial Relations
HROB*3010	[0.50]	Managing and Rewarding Performance
HROB*3030	[0.50]	Workplace Health and Safety
HROB*3070	[0.50]	Attracting and Acquiring Talent
HROB*3090	[0.50]	Developing Talent
HROB*4060	[0.50]	Workforce Optimization

**Courses to prepare for a post-graduate program in Industrial Relations:**

ECON*2200	[0.50]	Industrial Relations
ECON*3400	[0.50]	The Economics of Personnel Management
ECON*3520	[0.50]	Labour Economics
ECON*3620	[0.50]	International Trade
ECON*4790	[0.50]	Topics in Labour Market Theory
HROB*3010	[0.50]	Managing and Rewarding Performance
HROB*3030	[0.50]	Workplace Health and Safety

HROB*3070	[0.50]	Attracting and Acquiring Talent
HROB*3090	[0.50]	Developing Talent
HROB*4060	[0.50]	Workforce Optimization

**Courses toward the Leadership Certificate:**(see <http://www.leadershipcertificate.com/> for more information)

HROB*2010	[0.50]	Foundations of Leadership
HROB*4010	[0.50]	Leadership Certificate Capstone
HROB*4030	[0.50]	Advanced Topics In Leadership and Organizational Management
HROB*4100	[1.00]	Evidence-Based People Management
POLS*2250	[0.50]	Public Administration and Governance
POLS*3440	[0.50]	Corruption, Scandal and Political Ethics

**Courses in Public Administration:**

ECON*3610	[0.50]	Public Economics
POLS*2250	[0.50]	Public Administration and Governance
POLS*2300	[0.50]	Canadian Government and Politics
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3250	[0.50]	Public Policy: Challenges and Prospects
POLS*3270	[0.50]	Local Government in Ontario
POLS*3470	[0.50]	Business-Government Relations in Canada

**Courses in Real Estate and Housing:**

ECON*3500	[0.50]	Urban Economics **
REAL*1820	[0.50]	Real Estate and Housing
REAL*2820	[0.50]	Real Estate Finance
REAL*3890	[0.50]	Property Management
REAL*4820	[0.50]	Real Estate Appraisal **

\*\* These courses count towards the Post Graduate Valuation Certificate offered by UBC, part of the requirements to obtain an Accredited Appraiser Canadian Institute designation

**Courses in Corporate Social Responsibility:**

BUS*4550	[0.50]	Applied Business Project I
BUS*4560	[0.50]	Applied Business Project II
ECON*2650	[0.50]	Introductory Development Economics
ECON*3300	[0.50]	Economics of Health and the Workplace
ECON*4930	[0.50]	Environmental Economics
HROB*3030	[0.50]	Workplace Health and Safety
REAL*2850	[0.50]	Service Learning in Housing
MGMT*4050	[0.50]	Business Consulting
MGMT*4060	[0.50]	Business Consulting

**Courses in Marketing:**

MCS*2600	[0.50]	Fundamentals of Consumer Behaviour
MCS*3000	[0.50]	Advanced Marketing
MCS*3010	[0.50]	Quality Management
MCS*3620	[0.50]	Marketing Communications
MCS*4400	[0.50]	Pricing Management

**Courses in Food and Agribusiness:**

FARE*2410	[0.50]	Agri-food Markets and Policy
FARE*3030	[0.50]	The Firm and Markets
FARE*3170	[0.50]	Cost-Benefit Analysis
FARE*4000	[0.50]	Agricultural and Food Policy
FARE*4220	[0.50]	Advanced Agribusiness Management

**Marketing Management (MKMN)****Department of Marketing and Consumer Studies, College of Business and Economics**

The Marketing Management major is interdisciplinary, follows a liberal education philosophy, and is built on the Department's expertise in the field of marketing and consumer research.

The Department of Marketing and Consumer Studies prepares students for a career in marketing but also for educating them so that they can be active and engaged citizens. This is achieved from a balanced curriculum of marketing and liberal education courses that provide students with an understanding of the world they will work and live in. Students will gain knowledge in creating, communicating, and delivering product offerings to create value to stakeholders in a global and connected economy. Students completing this major will be prepared to pursue a variety of marketing career paths and diverse leadership roles.

Elective options enable students to select courses which support or complement their primary field of study. Examples: (1) students can use a combination of restricted, Liberal Education, and free electives to earn the Certificate in Leadership. See <http://www.leadershipcertificate.com/> for information about this certificate and its course requirements; (2) students interested in languages and/or going on exchange can use their Liberal Education and free electives to study one or more of the various languages taught at the University. Note: students also can take courses of interest as electives without concern for categories.

**Degree Requirements (20.00 Total Credits)**

13.00 - Required Core Courses

2.50 - Restricted Electives (from lists)

1.50 - Liberal Education Electives

3.00 - Free Electives

**Major****Semester 1- Fall**

ECON*1050	[0.50]	Introductory Microeconomics
MGMT*1000	[1.00]	Introduction to Business

**Semester 2 - Winter**

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
MCS*1000	[0.50]	Introductory Marketing

**Semesters 1 or 2 - Fall or Winter**

MATH*1030	[0.50]	Business Mathematics
PSYC*1000	[0.50]	Introduction to Psychology
0.50 Marketing Environment electives (see List E1)		
0.50 electives		

**Semester 3 - Fall**

ACCT*2230	[0.50]	Management Accounting
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*2000	[0.50]	Business Communication in a Changing World

**Semester 4 - Winter**

One of:

ECON*2740	[0.50]	Economic Statistics
PSYC*1010	[0.50]	Making Sense of Data in Psychological Research
STAT*2060	[0.50]	Statistics for Business Decisions

**Semesters 3 or 4 - Fall or Winter**

MCS*2020	[0.50]	Information Management
MCS*2600	[0.50]	Fundamentals of Consumer Behaviour
MCS*3040	[0.50]	Business and Consumer Law
0.50 History/Global Perspective electives (see List E2)		
1.00 electives		

**Semesters 5 or 6 - Fall or Winter**

ECON*2560	[0.50]	Theory of Finance
FARE*3310	[0.50]	Operations Management
MCS*3030	[0.50]	Research Methods
MCS*3500	[0.50]	Marketing Analytics
MCS*3620	[0.50]	Marketing Communications
MGMT*3320	[0.50]	Financial Management
0.50 Leadership/Professionalism electives (see List E3)		
1.50 electives		

**Semesters 7 or 8 - Fall or Winter**

MCS*3600	[0.50]	Consumer Information Processes
MCS*4370	[0.50]	Marketing Strategy
MCS*4600	[0.50]	International Marketing
MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*4000	[0.50]	Strategic Management
0.50 Advanced Marketing electives (see List E4)		
0.50 Experiential Learning Capstone electives (see List E5)		
1.50 electives		

**Restricted Electives for the Marketing Management Major**

Substitutions for restricted electives will be allowed if a Marketing and Consumer Studies Faculty Advisor agrees that a proposed alternative is relevant to marketing in today's world and has an appropriate level of rigour.

**Marketing Environment Elective - List E1**

To supplement the knowledge students gain in MCS\*1000 about the socio-cultural, economic, political/legal, and technological "environmental" factors that must be taken into consideration in marketing decision-making, marketing management majors must take one [0.50 credits] of:

ANTH*1150	[0.50]	Introduction to Anthropology
EDRD*1400	[0.50]	Introduction to Design
FRHD*1010	[0.50]	Human Development
GEOG*1200	[0.50]	Society and Space
GEOG*1220	[0.50]	Human Impact on the Environment
GEOG*2510	[0.50]	Canada: A Regional Synthesis
NUTR*1010	[0.50]	Introduction to Nutrition
PHIL*2070	[0.50]	Philosophy of the Environment
POLS*1400	[0.50]	Issues in Canadian Politics
POLS*2250	[0.50]	Public Administration and Governance
POLS*2300	[0.50]	Canadian Government and Politics
SOC*1100	[0.50]	Sociology

**History/Global Elective - List E2**

To help marketing majors develop a sense of the fundamental relativity of knowledge and understanding over time and/or to help them gain the global perspective needed in senior marketing courses, marketing management majors must take one [0.50 credits] of:

ARTH*2490	[0.50]	History of Canadian Art
BIOL*1500	[0.50]	Humans in the Natural World
GEOG*2030	[0.50]	Environment and Development
HIST*1150	[0.50]	The Modern World
HIST*1250	[0.50]	Science and Technology in a Global Context
HIST*2070	[0.50]	World Religions
HIST*2250	[0.50]	Environment and History
HIST*2300	[0.50]	The United States Since 1776
HIST*2510	[0.50]	Modern Europe Since 1789
HIST*2910	[0.50]	Modern Asia
HIST*2930	[0.50]	Women and Cultural Change
HIST*3070	[0.50]	Modern India
HIST*3150	[0.50]	History and Culture of Mexico
ISS*2000	[0.50]	Asia
POLS*1500	[0.50]	World Politics
POLS*2080	[0.50]	Development and Underdevelopment
POLS*2200	[0.50]	International Relations

**Leadership/Professionalism Elective - List E3**

To help prepare senior marketing management majors for leadership positions in organizations, they must take one [0.50 credits] of:

ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2410	[0.50]	Intermediate Macroeconomics
EDRD*3160	[0.50]	International Communication
EDRD*4120	[0.50]	Leadership Development in Small Organizations
HROB*2010	[0.50]	Foundations of Leadership
MGMT*4260	[0.50]	International Business
PHIL*2100	[0.50]	Critical Thinking
PHIL*2120	[0.50]	Ethics
PHIL*2600	[0.50]	Business and Professional Ethics

**Advanced Marketing Elective - List E4**

To address the University Learning Objective of “Depth and Breadth of Learning” and to enhance the knowledge of product development, placement strategies, and the integration of societal influences on thinking, senior marketing management majors must take one [0.5 credits] of:

MCS*3010	[0.50]	Quality Management
MCS*4020	[0.50]	Research in Consumer Studies
MCS*4040	[0.50]	Management in Product Development
MCS*4060	[0.50]	Retail Management
MCS*4300	[0.50]	Marketing and Society
MCS*4400	[0.50]	Pricing Management
MCS*4910	[0.50]	Topics in Consumer Studies
MGMT*4350	[0.50]	Business Case Competition Preparation

**Experiential Learning Capstone Electives - List E5**

To enhance their understanding of marketing in terms of application, senior marketing management majors must take one [0.50 credits] of:

HROB*4010	[0.50]	Leadership Certificate Capstone
MCS*4100	[0.50]	Entrepreneurship
MCS*4920	[0.50]	Topics in Consumer Studies
MCS*4950	[0.50]	Consumer Studies Practicum
MGMT*4020	[0.50]	Interdisciplinary Food Product Development I
MGMT*4030	[0.50]	Interdisciplinary Food Product Development II
MGMT*4050	[0.50]	Business Consulting
MGMT*4060	[0.50]	Business Consulting

**Marketing Management (Co-op) (MKMN:C)****Department of Marketing and Consumer Studies, College of Business and Economics**

The Co-op program in Marketing Management is designed to facilitate the transition of students from academic studies to a professional career by enhancing the integration of theory and practice.

The Co-op program in Marketing Management is a five year program including 5 work terms. Although the recommended schedule includes 5 work terms, students have the option to complete only 4 of the 5 work terms, but must graduate with a Fall, Winter, and Summer work term. Please refer to the Co-operative Education program policy with respect to adjusting the schedule listed below.

Students are eligible to participate in a maximum two (2) summer employment processes and must follow the academic work schedule as outlined on the Co-operative Education and Career Services website: <https://www.recrutguelpq.ca/cecs/>.

In order for students to be eligible to continue in the Co-op program, they must meet a minimum 70% cumulative average requirement after second semester, as well as meet all work term requirements. Please refer to the Co-operative Education program policy with respect to work term performance grading and work term report grading.

For additional program information, students should consult with the B.Comm. Program Counsellors or the MKMN Co-op Faculty Advisor.

Elective options enable students to select courses which support or complement their primary field of study. Examples: (1) students can use a combination of restricted, Liberal Education, and free electives to earn the Certificate in Leadership. See <http://www.leadershipcertificate.com/> for information about this certificate and its course requirements; (2) students interested in languages and/or going on exchange can use their Liberal Education and free electives to study one or more of the various languages taught at the University. Note: students also can take courses of interest as electives without concern for categories.

**Degree Requirements (20.00 Total Credits)**

13.00 - Required Core Courses

2.50 - Restricted Electives (from lists)

1.50 - Liberal Education Electives

3.00 - Free Electives

**Major****Semester 1- Fall**

ECON*1050	[0.50]	Introductory Microeconomics
MGMT*1000	[1.00]	Introduction to Business

**Semester 2 - Winter**

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
MCS*1000	[0.50]	Introductory Marketing

**Semesters 1 or 2 - Fall or Winter**

MATH*1030	[0.50]	Business Mathematics
PSYC*1000	[0.50]	Introduction to Psychology
0.50 Marketing Environment electives (see List E1)		
0.50 electives		

**Semester 3 - Fall**

ACCT*2230	[0.50]	Management Accounting
COOP*1100	[0.00]	Introduction to Co-operative Education
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*2000	[0.50]	Business Communication in a Changing World

One of:

ECON*2740	[0.50]	Economic Statistics
PSYC*1010	[0.50]	Making Sense of Data in Psychological Research
STAT*2060	[0.50]	Statistics for Business Decisions

0.50 electives

**Semesters 3 or 4 - Fall or Winter**

MCS*2020	[0.50]	Information Management
MCS*2600	[0.50]	Fundamentals of Consumer Behaviour
MCS*3030	[0.50]	Research Methods
MCS*3040	[0.50]	Business and Consumer Law

0.50 History/Global Perspective electives (see List E2)

**Summer Semester**

COOP*1000	[0.00]	Co-op Work Term I
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**Fall Semester**

COOP*2000	[0.00]	Co-op Work Term II
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**Semester 5 - Winter**

The following 5.00 credits must be completed over semesters 5 and 6. Select 2.50 credits in Winter Semester 5 and the remaining 2.50 in Fall Semester 6:

ECON*2560	[0.50]	Theory of Finance
FARE*3310	[0.50]	Operations Management
MCS*3500	[0.50]	Marketing Analytics
MCS*3620	[0.50]	Marketing Communications
MGMT*3320	[0.50]	Financial Management

0.50 Leadership/Professionalism electives (see List E3)

2.00 electives

**Summer Semester**

COOP*3000	[0.00]	Co-op Work Term III
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**Semester 6 - Fall**

Select 2.50 credits from the list below that were not taken in Winter Semester 5:

ECON*2560	[0.50]	Theory of Finance
FARE*3310	[0.50]	Operations Management
MCS*3500	[0.50]	Marketing Analytics
MCS*3620	[0.50]	Marketing Communications
MGMT*3320	[0.50]	Financial Management

0.50 Leadership/Professionalism electives (see List E3)

2.00 electives

**Winter Semester**

COOP*4000	[0.00]	Co-op Work Term IV (Eight month work term in conjunction with COOP*5000)
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**Summer Semester**

COOP\*5000 [0.00] Co-op Work Term V  
(Eight month work term in conjunction with COOP\*4000)

**Semesters 7 or 8 - Fall or Winter**

MCS\*3600 [0.50] Consumer Information Processes  
MCS\*4370 [0.50] Marketing Strategy  
MCS\*4600 [0.50] International Marketing  
MGMT\*3020 [0.50] Corporate Social Responsibility  
MGMT\*4000 [0.50] Strategic Management  
0.50 Advanced Marketing electives (see List E4)  
0.50 Experiential Learning Capstone electives (see List E5)  
1.50 electives

**Restricted Electives for the Marketing Management Major**

Substitutions for restricted electives will be allowed if a Marketing and Consumer Studies Faculty Advisor agrees that a proposed alternative is relevant to marketing in today's world and has an appropriate level of rigour.

**Marketing Environment Elective - List E1**

To supplement the knowledge students gain in MCS\*1000 about the socio-cultural, economic, political/legal, and technological "environmental" factors that must be taken into consideration in marketing decision-making, marketing management majors must take one [0.50 credits] of:

ANTH\*1150 [0.50] Introduction to Anthropology  
EDRD\*1400 [0.50] Introduction to Design  
FRHD\*1010 [0.50] Human Development  
GEOG\*1200 [0.50] Society and Space  
GEOG\*1220 [0.50] Human Impact on the Environment  
GEOG\*2510 [0.50] Canada: A Regional Synthesis  
NUTR\*1010 [0.50] Introduction to Nutrition  
PHIL\*2070 [0.50] Philosophy of the Environment  
POLS\*1400 [0.50] Issues in Canadian Politics  
POLS\*2250 [0.50] Public Administration and Governance  
POLS\*2300 [0.50] Canadian Government and Politics  
SOC\*1100 [0.50] Sociology

**History/Global Elective - List E2**

To help marketing majors develop a sense of the fundamental relativity of knowledge and understanding over time and/or to help them gain the global perspective needed in senior marketing courses, marketing management majors must take one [0.50 credits] of:

ARTH\*2490 [0.50] History of Canadian Art  
BIOL\*1500 [0.50] Humans in the Natural World  
GEOG\*2030 [0.50] Environment and Development  
HIST\*1150 [0.50] The Modern World  
HIST\*1250 [0.50] Science and Technology in a Global Context  
HIST\*2070 [0.50] World Religions  
HIST\*2250 [0.50] Environment and History  
HIST\*2300 [0.50] The United States Since 1776  
HIST\*2510 [0.50] Modern Europe Since 1789  
HIST\*2910 [0.50] Modern Asia  
HIST\*2930 [0.50] Women and Cultural Change  
HIST\*3070 [0.50] Modern India  
HIST\*3150 [0.50] History and Culture of Mexico  
ISS\*2000 [0.50] Asia  
POLS\*1500 [0.50] World Politics  
POLS\*2080 [0.50] Development and Underdevelopment  
POLS\*2200 [0.50] International Relations

**Leadership/Professionalism Elective - List E3**

To help prepare senior marketing management majors for leadership positions in organizations, they must take one [0.50 credits] of:

ECON\*2310 [0.50] Intermediate Microeconomics  
ECON\*2410 [0.50] Intermediate Macroeconomics  
EDRD\*3160 [0.50] International Communication  
EDRD\*4120 [0.50] Leadership Development in Small Organizations  
HROB\*2010 [0.50] Foundations of Leadership  
MGMT\*4260 [0.50] International Business  
PHIL\*2100 [0.50] Critical Thinking  
PHIL\*2120 [0.50] Ethics  
PHIL\*2600 [0.50] Business and Professional Ethics

**Advanced Marketing Elective - List E4**

To address the University Learning Objective of "Depth and Breadth of Learning" and to enhance the knowledge of product development, placement strategies, and the integration of societal influences on thinking, senior marketing management majors must take one [0.5 credits] of:

MCS\*3010 [0.50] Quality Management  
MCS\*4020 [0.50] Research in Consumer Studies  
MCS\*4040 [0.50] Management in Product Development  
MCS\*4060 [0.50] Retail Management

MCS\*4300 [0.50] Marketing and Society  
MCS\*4400 [0.50] Pricing Management  
MCS\*4910 [0.50] Topics in Consumer Studies  
MGMT\*4350 [0.50] Business Case Competition Preparation

**Experiential Learning Capstone Electives - List E5**

To enhance their understanding of marketing in terms of application, senior marketing management majors must take one [0.50 credits] of:

HROB\*4010 [0.50] Leadership Certificate Capstone  
MCS\*4100 [0.50] Entrepreneurship  
MCS\*4920 [0.50] Topics in Consumer Studies  
MCS\*4950 [0.50] Consumer Studies Practicum  
MGMT\*4020 [0.50] Interdisciplinary Food Product Development I  
MGMT\*4030 [0.50] Interdisciplinary Food Product Development II  
MGMT\*4050 [0.50] Business Consulting  
MGMT\*4060 [0.50] Business Consulting

**Public Management (PMGT)****Department of Economics and Finance, College of Business and Economics**

The Public Management program is designed to lead to an understanding of public sector administration and management from the "inside" - as an integrated enterprise - as well as from the outside - as a series of policy decisions and outcomes. Characterized by a multi-disciplinary approach employing political, economic and business-oriented analysis, students will confront questions of why politicians and public servants behave the way they do, and how their policy choices and processes can be optimized. Management of public entities features a unique set of challenges that arise from and interact with basic political issues like democracy, accountability, equity, fairness, and justice. At the same time it necessarily faces concerns common to all organizations, such as efficiency, human and capital resource management, morale, planning, and adaptation to change.

The program will appeal to students interested in the public service, public sector businesses or business-government relations.

Students enrolled in the PMGT major can choose to complete three of the five required courses for the Certificate in Leadership as part of their requirements for the program if they choose the appropriate restricted electives. If you would like to graduate both with a BComm degree and the Certificate in Leadership you should use two of your free electives to enroll in HROB\*2010 in either semester 3 or 6 and HROB\*4010 in semester 8. In addition to the five degree-credit courses selected from the above list, 120 hours of leadership practice are required to obtain the undergraduate Certificate in Leadership. See <http://www.leadershipcertificate.com/> for information regarding this Certificate and its course requirements.

**Degree Requirements (20.00 Total Credits)**

12.00 - Required Core Courses

5.00 - Restricted Electives (from lists)

1.50 - Liberal Education Electives

1.50 - Free Electives

**Major****Semester 1**

ECON\*1050 [0.50] Introductory Microeconomics  
MCS\*1000 [0.50] Introductory Marketing  
MGMT\*1000 [1.00] Introduction to Business  
POLS\*1400 [0.50] Issues in Canadian Politics

**Semester 2**

ECON\*1100 [0.50] Introductory Macroeconomics  
HROB\*2090 [0.50] Individuals and Groups in Organizations  
MATH\*1030 [0.50] Business Mathematics  
POLS\*2300 [0.50] Canadian Government and Politics

0.50 electives

**Semester 3**

ACCT\*1220 [0.50] Introductory Financial Accounting  
ECON\*2310 [0.50] Intermediate Microeconomics  
ECON\*2740 [0.50] Economic Statistics  
POLS\*3250 [0.50] Public Policy: Challenges and Prospects

One of:

ECON\*2100 [0.50] Economic Growth and Environmental Quality  
ECON\*2200 [0.50] Industrial Relations  
ECON\*2650 [0.50] Introductory Development Economics

**Semester 4**

ACCT\*2230 [0.50] Management Accounting  
ECON\*2410 [0.50] Intermediate Macroeconomics  
POLS\*2250 [0.50] Public Administration and Governance

One of:

PHIL\*2120 [0.50] Ethics  
PHIL\*2600 [0.50] Business and Professional Ethics  
PHIL\*3040 [0.50] Philosophy of Law \*

0.50 electives



\* This course may be offered in the fall and can be taken later in the program.

### Semester 5

ECON*2560	[0.50]	Theory of Finance
FARE*3310	[0.50]	Operations Management
MGMT*3320	[0.50]	Financial Management
One of:		
MCS*3040	[0.50]	Business and Consumer Law
HROB*3050	[0.50]	Employment Law
REAL*4840	[0.50]	Housing and Real Estate Law

0.50 electives

### Semester 6

MCS*2020	[0.50]	Information Management
MGMT*3020	[0.50]	Corporate Social Responsibility

One of:

ECON*3300	[0.50]	Economics of Health and the Workplace
ECON*3400	[0.50]	The Economics of Personnel Management
ECON*3520	[0.50]	Labour Economics
ECON*3580	[0.50]	Economics of Regulation
ECON*3620	[0.50]	International Trade
One of:		
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3130	[0.50]	Law, Politics and Judicial Process
POLS*3270	[0.50]	Local Government in Ontario
POLS*3670	[0.50]	Comparative Public Policy and Administration

0.50 electives

### Semester 7

ECON*3610	[0.50]	Public Economics
POLS*3470	[0.50]	Business-Government Relations in Canada

One of:

ECON*3300	[0.50]	Economics of Health and the Workplace
ECON*3400	[0.50]	The Economics of Personnel Management
ECON*3520	[0.50]	Labour Economics
ECON*3580	[0.50]	Economics of Regulation
ECON*3620	[0.50]	International Trade

One of\*\*:

POLS*4160	[1.00]	Multi-Level Governance in Canada
POLS*4250	[1.00]	Topics in Public Management
POLS*4270	[0.50]	Advanced Lecture in Public Management
POLS*4970	[0.50]	Honours Political Science Research I

0.50 credits at the 3000 or 4000 level in Economics or Political Science

0.50 electives\*\*\*

### Semester 8

MGMT*4000	[0.50]	Strategic Management
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One of:

ECON*4400	[0.50]	Economics of Organizations and Corporate Governance
ECON*4800	[0.50]	Competitiveness and Strategic Advantage

One of\*\*:

POLS*4160	[1.00]	Multi-Level Governance in Canada
POLS*4250	[1.00]	Topics in Public Management
POLS*4980	[0.50]	Honours Political Science Research II

0.50 credits at the 4000 level in Economics

One of:

POLS*3130	[0.50]	Law, Politics and Judicial Process
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3270	[0.50]	Local Government in Ontario
POLS*3670	[0.50]	Comparative Public Policy and Administration

0.50 electives\*\*\*

\*\* If a 1.00 credit POLS is taken in either semester 7 or 8 this will meet the restricted elective requirement for both semesters.

\*\*\* The number of electives will change if a 1.00 credit POLS course is taken in semester 7 or 8

## Public Management (Co-op) (PMGT:C)

### Department of Economics and Finance, College of Business and Economics

A principal aim of the Co-op program in Public Management is to facilitate the transition of students from academic studies to a professional career by enhancing the integration of theory and practice.

The Co-op program in Public Management is a five year program, including 5 work terms. Although the schedule includes 5 work terms, students have the option to complete only 4 of the 5 work terms, but must graduate with a Fall, Winter and Summer work term. Students are eligible to participate in a maximum two (2) summer employment processes and must follow the academic work schedule as outlined on the Co-operative Education and Career Services website: <https://www.recrutguelph.ca/cecs/>.

In order for students to be eligible to continue in the Co-op program, they must meet a minimum 70% cumulative average requirement after second semester, as well as meet all work term requirements. Please refer to the Co-operative Education program policy with respect to work term performance grading and work term report grading.

For additional program information students should consult with their Co-op Co-ordinator and Co-op Faculty Advisor, listed on the Co-operative Education and Career Services web site.

Students enrolled in the PMGT major may choose to complete three of the five required courses for the Certificate in Leadership as part of their requirements for the program if they select the appropriate restricted electives. If you would like to graduate both with a BComm degree and the Certificate in Leadership you should use two of your free electives to enroll in HROB\*2010 in either semester 3 or 6 and HROB\*4010 in semester 8. In addition to the five degree-credit courses selected from the above list, 120 hours of leadership practice are required to obtain the undergraduate Certificate in Leadership. See <http://www.leadershipcertificate.com/> for information regarding this Certificate and its course requirements.

### Degree Requirements (20.00 Total Credits)

12.00 - Required Core Courses

5.00 - Restricted Electives (from lists)

1.50 - Liberal Education Electives

1.50 - Free Electives

### Major

#### Semester 1

ECON*1050	[0.50]	Introductory Microeconomics
MCS*1000	[0.50]	Introductory Marketing
MGMT*1000	[1.00]	Introduction to Business
POLS*1400	[0.50]	Issues in Canadian Politics

#### Semester 2

ECON*1100	[0.50]	Introductory Macroeconomics
HROB*2090	[0.50]	Individuals and Groups in Organizations
MATH*1030	[0.50]	Business Mathematics
POLS*2300	[0.50]	Canadian Government and Politics

0.50 elective

#### Semester 3

ACCT*1220	[0.50]	Introductory Financial Accounting
COOP*1100	[0.00]	Introduction to Co-operative Education
ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2740	[0.50]	Economic Statistics
POLS*3250	[0.50]	Public Policy: Challenges and Prospects

One of:

ECON*2100	[0.50]	Economic Growth and Environmental Quality
ECON*2200	[0.50]	Industrial Relations
ECON*2650	[0.50]	Introductory Development Economics

#### Semester 4 - Winter

ACCT*2230	[0.50]	Management Accounting
ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2560	[0.50]	Theory of Finance
POLS*2250	[0.50]	Public Administration and Governance

0.50 electives

#### Summer Semester

COOP*1000	[0.00]	Co-op Work Term I
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#### Fall Semester

COOP*2000	[0.00]	Co-op Work Term II
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#### Semester 5 - Winter

FARE*3310	[0.50]	Operations Management
MCS*2020	[0.50]	Information Management
MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management

One of:

PHIL*2120	[0.50]	Ethics
PHIL*2600	[0.50]	Business and Professional Ethics
PHIL*3040	[0.50]	Philosophy of Law

\* This course may be offered in the fall and can be taken later in the program.

#### Summer Semester

COOP*3000	[0.00]	Co-op Work Term III
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#### Semester 6 - Fall

ECON*3610	[0.50]	Public Economics
POLS*3470	[0.50]	Business-Government Relations in Canada

One of:

ECON*3300	[0.50]	Economics of Health and the Workplace
ECON*3400	[0.50]	The Economics of Personnel Management
ECON*3520	[0.50]	Labour Economics

ECON*3580	[0.50]	Economics of Regulation
ECON*3620	[0.50]	International Trade
One of:		
MCS*3040	[0.50]	Business and Consumer Law
HROB*3050	[0.50]	Employment Law
REAL*4840	[0.50]	Housing and Real Estate Law

0.50 electives

**Winter Semester**

COOP*4000	[0.00]	Co-op Work Term IV
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(Eight month work term in conjunction with COOP\*5000)

**Summer Semester**

COOP*5000	[0.00]	Co-op Work Term V
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(Eight month work term in conjunction with COOP\*4000)

**Semester 7 - Fall**

MGMT*4000	[0.50]	Strategic Management
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One of:

ECON*3300	[0.50]	Economics of Health and the Workplace
ECON*3400	[0.50]	The Economics of Personnel Management
ECON*3520	[0.50]	Labour Economics
ECON*3580	[0.50]	Economics of Regulation
ECON*3620	[0.50]	International Trade

One of\*\*:

POLS*4160	[1.00]	Multi-Level Governance in Canada
POLS*4250	[1.00]	Topics in Public Management
POLS*4270	[0.50]	Advanced Lecture in Public Management
POLS*4970	[0.50]	Honours Political Science Research I

0.50 credits at the 3000 or 4000 level in Economics or 4000 level in Political Science

1.00 electives\*\*\*

**Semester 8 - Winter**

Two of:

POLS*3130	[0.50]	Law, Politics and Judicial Process
POLS*3210	[0.50]	The Constitution and Canadian Federalism
POLS*3270	[0.50]	Local Government in Ontario
POLS*3670	[0.50]	Comparative Public Policy and Administration

One of\*\*\*:

POLS*4160	[1.00]	Multi-Level Governance in Canada
POLS*4250	[1.00]	Topics in Public Management
POLS*4980	[0.50]	Honours Political Science Research II

0.50 credits at the 4000 level in Economics

One of:

ECON*4400	[0.50]	Economics of Organizations and Corporate Governance
ECON*4800	[0.50]	Competitiveness and Strategic Advantage

0.50 electives\*\*\*

\*\* If a 1.00 credit POLS is taken in either semester 7 or 8 this will meet the restricted elective requirement for both semesters.

\*\*\* The number of electives will change if a 1.00 credit POLS course is taken in semester 7 or 8

**Real Estate and Housing (REH)****Department of Marketing and Consumer Studies, College of Business and Economics**

The Real Estate and Housing major in the B.Comm. program is one of only a few undergraduate programs in Canada that specialize in the real estate sector. It takes a multi-disciplinary approach to the study of residential and commercial/investment real estate. Topics such as the development, financing, valuation, market analysis and management of real estate are taught in the context of economic, legal, political and social factors affecting this large and growing field of business in Canada and the world.

The purpose of this major is to develop the conceptual, analytical and management skills required for careers in real estate and housing. Students graduate with a degree that can lead to a variety of professional positions in the private or public sectors of the Canadian real estate industry or they can continue on to graduate work in business, planning or the social sciences.

Elective options enable students to select courses which support or complement their primary field of study. Examples: (1) students can use Liberal Education and free electives to earn the Certificate in Leadership. See <http://www.leadershipcertificate.com/> for information regarding this Certificate and its course requirements; (2) students interested in languages and/or going on exchange can use their Liberal Education and free electives to study one or more of the various languages taught at the University. (3) Students interested in obtaining their Accredited Appraiser Canadian Institute (AACI) designation should consider taking some of the additional 4 required courses through University of British Columbia distance education by letter of permission to count as electives in their degree, once they have completed REAL\*4820.

Students may consult the REH Faculty Advisor or B.Comm. Program Counsellor for additional information.

**Degree Requirements (20.00 Total Credits)**

16.00 - Required Core Courses

1.50 - Liberal Education Electives

2.50 - Free Electives

**Major****Semester 1**

ECON*1050	[0.50]	Introductory Microeconomics
REAL*1820	[0.50]	Real Estate and Housing
MGMT*1000	[1.00]	Introduction to Business

0.50 electives

**Semester 2**

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
MCS*1000	[0.50]	Introductory Marketing
MATH*1030	[0.50]	Business Mathematics

0.50 electives

**Semester 3**

ACCT*2230	[0.50]	Management Accounting
ECON*2310	[0.50]	Intermediate Microeconomics
REAL*2850	[0.50]	Service Learning in Housing

One of:

ECON*2740	[0.50]	Economic Statistics
STAT*2060	[0.50]	Statistics for Business Decisions

0.50 electives

**Semester 4**

ECON*2560	[0.50]	Theory of Finance
HROB*2090	[0.50]	Individuals and Groups in Organizations
MCS*2020	[0.50]	Information Management
REAL*2820	[0.50]	Real Estate Finance

0.50 electives

**Semester 5**

ECON*2410	[0.50]	Intermediate Macroeconomics
FARE*3310	[0.50]	Operations Management
REAL*4820	[0.50]	Real Estate Appraisal
REAL*4840	[0.50]	Housing and Real Estate Law

0.50 electives

**Semester 6**

ECON*3960	[0.50]	Money, Credit and the Financial System
LARC*2820	[0.50]	Urban and Regional Planning
MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management
REAL*3890	[0.50]	Property Management

**Semester 7**

ECON*3500	[0.50]	Urban Economics
MGMT*4000	[0.50]	Strategic Management
REAL*3810	[0.50]	Real Estate Market Analysis
REAL*4870	[0.50]	Sustainable Real Estate

0.50 electives

**Semester 8**

POLS*3270	[0.50]	Local Government in Ontario
REAL*4830	[1.00]	Real Estate Development Project

1.00 electives

**Real Estate and Housing (Co-op) (REH:C)****Department of Marketing and Consumer Studies, College of Business and Economics**

The Real Estate and Housing major in the B.Comm. program is one of only a few undergraduate programs in Canada that specialize in the real estate sector. It takes a multi-disciplinary approach to the study of residential and commercial/investment real estate.

The purpose of this major is to develop the conceptual, analytical and management skills required for careers in real estate and housing. Students graduate with a degree that can lead to a variety of professional positions in the private or public sectors of the Canadian real estate industry or they can continue on to graduate work in business, planning or the social sciences.

A principal aim of the Co-op program in Real Estate and Housing is to facilitate the transition of students from academic studies to a professional career by enhancing the integration of theory and practice.

The Co-op program in Real Estate and Housing is a five year program, including 5 work terms. Although the schedule includes 5 work terms, students have the option to complete only 4 of the 5 work terms, but must graduate with a Fall, Winter and Summer work term. Students are eligible to participate in a maximum two (2) summer employment processes and must follow the academic work schedule as outlined on the Co-operative Education and Career Services website: <https://www.recruitguelph.ca/cecs/>. Please refer to the Co-operative Education programs policy with respect to adjusting the schedule listed below.

In order for students to be eligible to continue in the Co-op program, they must meet a minimum 70% cumulative average requirement after second semester, as well as meet all work term requirements. Please refer to the Co-operative Education programs policy with respect to work term performance grading and work term report grading.

Elective options enable students to select courses which support or complement their primary field of study. Examples: (1) students can use Liberal Education and free electives to earn the Certificate in Leadership. See <http://www.leadershipcertificate.com/> for information regarding this Certificate and its course requirements; (2) students interested in languages and/or going on exchange can use their Liberal Education and free electives to study one or more of the various languages taught at the University. (3) Students interested in obtaining their Accredited Appraiser Canadian Institute (AACI) designation should consider taking some of the additional 4 required courses through University of British Columbia distance education by letter of permission to count as electives in their degree, once they have completed REAL\*4820.

For additional program information students should consult with the B.Comm Program Counsellors or their Co-op Co-ordinator and Co-op Faculty Advisor, listed on the Co-operative Education and Career Services web site.

### Degree Requirements (20.00 Total Credits)

16.00 - Required Core Courses

1.50 - Liberal Education Electives

2.50 - Free Electives

#### Major

##### Semester 1 - Fall

ECON*1050	[0.50]	Introductory Microeconomics
REAL*1820	[0.50]	Real Estate and Housing
MGMT*1000	[1.00]	Introduction to Business

0.50 electives

##### Semester 2 - Winter

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1100	[0.50]	Introductory Macroeconomics
MCS*1000	[0.50]	Introductory Marketing
MATH*1030	[0.50]	Business Mathematics

0.50 electives

##### Semester 3 - Fall

ACCT*2230	[0.50]	Management Accounting
COOP*1100	[0.00]	Introduction to Co-operative Education
ECON*2310	[0.50]	Intermediate Microeconomics
REAL*2850	[0.50]	Service Learning in Housing

One of:

ECON*2740	[0.50]	Economic Statistics
STAT*2060	[0.50]	Statistics for Business Decisions

0.50 electives

##### Semester 4 - Winter

ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2560	[0.50]	Theory of Finance
HROB*2090	[0.50]	Individuals and Groups in Organizations
REAL*2820	[0.50]	Real Estate Finance

0.50 electives

##### Summer Semester

COOP*1000	[0.00]	Co-op Work Term I
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##### Fall Semester

COOP*2000	[0.00]	Co-op Work Term II
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##### Semester 5 - Winter

ECON*3960	[0.50]	Money, Credit and the Financial System
FARE*3310	[0.50]	Operations Management
REAL*3890	[0.50]	Property Management
MCS*2020	[0.50]	Information Management

0.50 electives

##### Summer Semester

COOP*3000	[0.00]	Co-op Work Term III
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##### Semester 6 - Fall

MGMT*3020	[0.50]	Corporate Social Responsibility
MGMT*3320	[0.50]	Financial Management
REAL*4820	[0.50]	Real Estate Appraisal

REAL*4840	[0.50]	Housing and Real Estate Law
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0.50 electives

##### Winter Semester

COOP*4000	[0.00]	Co-op Work Term IV
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(Eight month work term in conjunction with COOP\*5000)

##### Summer Semester

COOP*5000	[0.00]	Co-op Work Term V
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(Eight month work term in conjunction with COOP\*4000)

##### Semester 7 - Fall

ECON*3500	[0.50]	Urban Economics
MGMT*4000	[0.50]	Strategic Management
REAL*3810	[0.50]	Real Estate Market Analysis
REAL*4870	[0.50]	Sustainable Real Estate

0.50 electives

##### Semester 8 - Winter

LARC*2820	[0.50]	Urban and Regional Planning
POLS*3270	[0.50]	Local Government in Ontario
REAL*4830	[1.00]	Real Estate Development Project

0.50 electives

## Bachelor of Computing (B.Comp.)

Students graduating from this program obtain a solid foundation in the theory and application of all aspects of computing and information science. Core subjects, combined with in-depth study in an area of application, give students the freedom to combine their interests in computing with other areas of study and application.

There are two majors available in the Bachelor of Computing honours program. The major in Computer Science provides a traditional computing foundation in software, hardware, and theory. The major in Software Engineering contains an emphasis on software development and design and has a greater focus on team work, communication skills, and professional standards.

Course projects are based on real-world software development scenarios and allows students to get the professional experience valued by today's high-tech employers. The focused study in a second discipline (area of application) gives students the background to effectively apply their knowledge.

Both majors require the equivalent of 8 semesters of successful full-time study. The general program requires the equivalent of 6 semesters of successful full-time study are available. Students in the honours program must choose a major in either Computer Science or Software Engineering. The majors are also available with a Co-op option.

Since not all courses are offered in every semester and prerequisite dependencies must be observed, students are encouraged to consult the program B.Comp. counsellor to plan an initial program of study or when considering modifications to the suggested schedule of studies list.

### Program Information

To graduate with an honours Degree with a major in Computer Science or Software Engineering a student must:

- Successfully complete 20.00 credits. These must include the 11.25 CIS credits, a minimum of 4.00 credits in an Area of Application and an additional 4.75 credits as free electives. Not more than 6.00 credits from courses at the introductory (1000) level may be counted towards the 20.00 credit requirement.

The program requires 6.00 Computing and Information Science credits at the 3000 level or above, which must include 2.00 credits at the 4000 level. The area of application requires an additional 1.00 credits at the 3000 level or above. The Area of Application is a graduation requirement and must be approved by Semester 4 by the faculty advisor.

- Obtain a cumulative average at least 70% in CIS courses and a 60% cumulative average in all courses.
- An Area of Application normally consists of 4.00 credits (normally 8 courses) of a minor. Minors are described under the B.A. and B.Sc. programs. Access to some courses may be limited. Minors are listed in Section X of the Calendar. A student may complete a minor should they decide to do so.

Students must consult the faculty advisor for approval of their Area of Application by semester 4. Not all disciplines or courses may be available as areas of application. Students failing to meet the graduation requirements of the honours program may apply to graduate with a general degree if the requirements for the general degree are met.

### Continuation of Study

Students are advised to consult the regulations for Continuation of Study which are outlined in detail in Section VIII Degree Regulations Procedures of this calendar.

### General Program

#### School of Computer Science, College of Physical and Engineering Science

To graduate from a general program a student must:

- Earn 15.00 credits. These must include courses that fulfill the distribution requirements of the general Degree (see below). At least 4.00 credits must be at the 3000 level or above. Not more than 6.00 credits at the introductory (1000) level may be counted towards the 15.00 credit requirement.
- No more than 11.00 credits in any one subject or discipline, as indicated by the course prefix code, can be counted towards a general degree.
- Successfully complete the following credits:

CIS*1500	[0.50]	Introduction to Programming
CIS*1910	[0.50]	Discrete Structures in Computing I
CIS*2430	[0.50]	Object Oriented Programming
CIS*2500	[0.50]	Intermediate Programming
CIS*2520	[0.50]	Data Structures
CIS*2750	[0.75]	Software Systems Development and Integration
CIS*2910	[0.50]	Discrete Structures in Computing II
CIS*3530	[0.50]	Data Base Systems and Concepts
0.50 additional CIS or STAT credits at the 2000 level or higher		
1.00 additional CIS credits at 3000 level or higher		

- Earn 2.00 science credits (list of courses available in the Program Counsellor's office) and 2.00 credits in the College of Arts or College of Social and Applied Human Sciences in addition to the courses listed in c.

## Computer Science (CS)

### School of Computer Science, College of Physical and Engineering Science

#### Major (Honours Program)

Since many courses are offered in only one semester and course pre-requisites place an ordering on courses, the following program of studies is designed so that students can schedule their courses over 8 semesters of study. Students deviating from this schedule must consult with their academic advisor.

#### Semester 1

CIS*1500	[0.50]	Introduction to Programming
MATH*1200	[0.50]	Calculus I

1.50 credits in the Area of Application or electives

#### Semester 2

CIS*1910	[0.50]	Discrete Structures in Computing I
CIS*2500	[0.50]	Intermediate Programming

1.50 credits in the Area of Application or electives

#### Semester 3

CIS*2030	[0.50]	Structure and Application of Microcomputers
CIS*2430	[0.50]	Object Oriented Programming
CIS*2520	[0.50]	Data Structures
CIS*2910	[0.50]	Discrete Structures in Computing II

0.50 credits in the Area of Application or electives

#### Semester 4

CIS*2750	[0.75]	Software Systems Development and Integration
CIS*3110	[0.50]	Operating Systems I
CIS*3490	[0.50]	The Analysis and Design of Computer Algorithms

0.75 credits in the Area of Application or elective

#### Semester 5

CIS*3150	[0.50]	Theory of Computation
CIS*3750	[0.75]	System Analysis and Design in Applications

One of:

CIS*2460	[0.50]	Modelling of Computer Systems
STAT*2040	[0.50]	Statistics I

0.75 credits in the Area of Application or electives

#### Semester 6

CIS*3760	[0.75]	Software Engineering
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0.50 C.I.S electives at the 3000 level or above

1.25 credits in the Area of Application or electives

#### Semester 7

1.00 credits in the Area of Application or electives  
0.50 credits in CIS at 3000 level or above  
1.00 credits in CIS at the 4000 level

#### Semester 8

CIS*4650	[0.50]	Compilers
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1.00 credits in the Area of Application or electives  
0.50 credits in CIS at the 3000 level or above  
0.50 credits in CIS at the 4000 level

## Computer Science (Co-op) (CS:C)

### Computing and Information Science, College of Physical and Engineering Science

The honours major in Computer Science is available with a Co-operative Education option. Students may apply for this option at the time of University admission or completion of semester 2. Please check with CIS Co-op faculty advisor for semester planning.

Since many courses are offered in only one semester and course pre-requisites place an ordering on courses, the following program of studies is designed so that students can schedule their courses over 8 semesters of study. Students deviating from this schedule must consult with their Co-op faculty advisor.

#### Computer Science Co-op Work Term Schedule

Year	Fall	Winter	Summer
1	Academic	Academic	Off
2	Academic	Academic	Work Term 1
3	Work Term 2	Academic	Work Term 3
4	Academic	Work Term 4	Work Term 5
5	Academic	Academic	N/A

**Note:** that a total of four work terms are necessary to complete the Co-op requirement. Students are eligible to participate in a maximum two (2) work terms commencing in the summer and must follow the academic work schedule as outlined in the Co-operative Education & Career Services website.

The course COOP\*1100 must be successfully completed before the student may apply for a placement for the first work term (normally 2 semesters before the first work term). COOP\*1000, COOP\*2000, COOP\*3000, COOP\*4000 and COOP\*5000 represent the first, second, third, fourth, and fifth work terms respectively.

Students are advised to plan their schedule of studies well in advance so that they can take all required prerequisites for later (especially 4000 level) courses. Students should note that some 4000 level courses are only given in alternate years. Failure to plan may result in the inability to take a particular senior CIS course. Not all sequences may be viable. Please check with the CIS Co-op faculty advisor for semester planning.

Conditions for graduation are the same as the corresponding regular B.Comp. program. In addition, all work reports and performance evaluations must have a grade of satisfactory or better.

### Major Co-op (Honours Program)

The recommended schedule of studies for Co-op is as follows:

#### Semester 1 - Fall

CIS\*1500 [0.50] Introduction to Programming

MATH\*1200 [0.50] Calculus I  
1.50 credits in the Area of Application or electives

#### Semester 2 - Winter

CIS\*1910 [0.50] Discrete Structures in Computing I

CIS\*2500 [0.50] Intermediate Programming

1.50 credits in the Area of Application or electives

#### Summer Semester - Off

#### Semester 3 - Fall

CIS\*2030 [0.50] Structure and Application of Microcomputers

CIS\*2430 [0.50] Object Oriented Programming

CIS\*2520 [0.50] Data Structures

CIS\*2910 [0.50] Discrete Structures in Computing II

COOP\*1100 [0.00] Introduction to Co-operative Education

0.50 credits in the Area of Application or electives

#### Semester 4 - Winter

CIS\*2750 [0.75] Software Systems Development and Integration

CIS\*3110 [0.50] Operating Systems I

CIS\*3490 [0.50] The Analysis and Design of Computer Algorithms

0.75 credits in the Area of Application or elective

#### Summer Semester

COOP\*1000 Work Term 1

#### Fall Semester

COOP\*2000 Work Term 2

#### Semester 5 - Winter

CIS\*3760 [0.75] Software Engineering

0.50 C.I.S. electives at the 3000 level or above

1.25 credits in the Area of Application or electives

#### Summer Semester

COOP\*3000 Work Term 3

#### Semester 6 - Fall

CIS\*3150 [0.50] Theory of Computation

CIS\*3750 [0.75] System Analysis and Design in Applications

One of:

CIS\*2460 [0.50] Modelling of Computer Systems

STAT\*2040 [0.50] Statistics I

0.75 credits in the Area of Application or electives

#### Winter Semester

COOP\*4000 Work Term 4

8-month work term in conjunction with COOP\*5000

#### Summer Semester

COOP\*5000 Work Term 5

8-month work term in conjunction with COOP\*4000

#### Semester 7 - Fall

1.00 credits in the Area of Application or electives

0.50 credits in CIS at 3000 level or above

1.00 credits in CIS at the 4000 level

#### Semester 8 - Winter

CIS\*4650 [0.50] Compilers

1.00 credits in the Area of Application or electives

0.50 credits in CIS at 3000 level or above

0.50 credits in CIS at the 4000 level

### Software Engineering (SENG)

School of Computer Science, College of Physical and Engineering Science

### Major (Honours Program)

Since many courses are offered in only one semester and course pre-requisites place an ordering on courses, the following program of studies is designed so that students can schedule their courses over 8 semesters of study. Students deviating from this schedule must consult with their academic advisor.

#### Semester 1

CIS\*1250 [0.50] Software Design I

CIS\*1500 [0.50] Introduction to Programming

1.50 credits in the Area of Application or electives

#### Semester 2

CIS\*1910 [0.50] Discrete Structures in Computing I

CIS\*2250 [0.50] Software Design II

CIS\*2500 [0.50] Intermediate Programming

1.00 credits in the Area of Application or electives

#### Semester 3

CIS\*2030 [0.50] Structure and Application of Microcomputers

CIS\*2430 [0.50] Object Oriented Programming

CIS\*2520 [0.50] Data Structures

CIS\*3250 [0.50] Software Design III

0.50 credits in the Area of Application or electives

#### Semester 4

CIS\*2750 [0.75] Software Systems Development and Integration

CIS\*3110 [0.50] Operating Systems I

CIS\*3490 [0.50] The Analysis and Design of Computer Algorithms

0.75 credits in the Area of Application or elective

#### Semester 5

CIS\*3260 [0.50] Software Design IV

CIS\*3750 [0.75] System Analysis and Design in Applications

One of:

CIS\*2460 [0.50] Modelling of Computer Systems

STAT\*2040 [0.50] Statistics I

0.75 credits in the Area of Application or electives

#### Semester 6

CIS\*3760 [0.75] Software Engineering

0.50 C.I.S. electives at the 3000 level or above

1.25 credits in the Area of Application or electives

#### Semester 7

CIS\*4150 [0.50] Software Reliability and Testing

CIS\*4250 [0.50] Software Design V

CIS\*4300 [0.50] Human Computer Interaction

1.00 credits in the Area of Application or electives

#### Semester 8

1.50 credits in the Area of Application or electives

0.50 credits in CIS at the 3000 level or above

0.50 credits in CIS at the 4000 level

### Software Engineering (Co-op) (SENG:C)

#### Computing and Information Science, College of Physical and Engineering Science

The honours major in Software Engineering is available with a Co-operative Education option. Students may apply for this option at the time of University admission or completion of semester 2. Please check with CIS Co-op faculty advisor for semester planning.

Since many courses are offered in only one semester and course pre-requisites place an ordering on courses, the following program of studies is designed so that students can schedule their courses over 8 semesters of study. Students deviating from this schedule must consult with their Co-op faculty advisor.

#### Software Engineering Co-op Work Term Schedule

Year	Fall	Winter	Summer
1	Academic	Academic	Off
2	Academic	Academic	Work Term 1
3	Work Term 2	Academic	Work Term 3
4	Academic	Work Term 4	Work Term 5
5	Academic	Academic	N/A

**Note:** that a total of four work terms are necessary to complete the Co-op requirement.

Students are eligible to participate in a maximum two (2) work terms commencing in the summer and must follow the academic work schedule as outlined in the Co-operative Education & Career Services website

The course COOP\*1100 must be successfully completed before the student may apply for a placement for the first work term (normally 2 semesters before the first work term). COOP\*1000, COOP\*2000, COOP\*3000, COOP\*4000 and COOP\*5000 represent the first, second, third, fourth, and fifth work terms respectively.

Students are advised to plan their schedule of studies well in advance so that they can take all required prerequisites for later (especially 4000 level) courses. Students should note that some 4000 level courses are only given in alternate years. Failure to plan may result in the inability to take a particular senior CIS course. Not all sequences may be viable. Please check with the CIS Co-op faculty advisor for semester planning.

Conditions for graduation are the same as the corresponding regular B.Comp. program. In addition, all work reports and performance evaluations must have a grade of satisfactory or better.

### Major (Honours Program) Co-op

The recommended schedule of studies for Co-op is as follows:

#### Semester 1 - Fall

CIS\*1250 [0.50] Software Design I  
 CIS\*1500 [0.50] Introduction to Programming

1.50 credits in the Area of Application or electives

#### Semester 2 - Winter

CIS\*1910 [0.50] Discrete Structures in Computing I  
 CIS\*2250 [0.50] Software Design II  
 CIS\*2500 [0.50] Intermediate Programming

1.00 credits in the Area of Application or electives

#### Summer Semester - Off

#### Semester 3 - Fall

CIS\*2030 [0.50] Structure and Application of Microcomputers  
 CIS\*2430 [0.50] Object Oriented Programming  
 CIS\*2520 [0.50] Data Structures  
 CIS\*3250 [0.50] Software Design III  
 COOP\*1100 [0.00] Introduction to Co-operative Education

0.50 credits in the Area of Application or electives

#### Semester 4 - Winter

CIS\*2750 [0.75] Software Systems Development and Integration  
 CIS\*3110 [0.50] Operating Systems I  
 CIS\*3490 [0.50] The Analysis and Design of Computer Algorithms

0.75 credits in the Area of Application or elective

#### Summer Semester

COOP\*1000 Work Term 1

#### Fall Semester

COOP\*2000 Work Term 2

#### Semester 5 - Winter

CIS\*3760 [0.75] Software Engineering  
 0.50 C.I.S electives at the 3000 level or above

1.25 credits in the Area of Application or electives

#### Summer Semester

COOP\*3000 Work Term 3

#### Semester 6 - Fall

CIS\*3260 [0.50] Software Design IV  
 CIS\*3750 [0.75] System Analysis and Design in Applications

One of:

CIS\*2460 [0.50] Modelling of Computer Systems  
 STAT\*2040 [0.50] Statistics I

0.75 credits in the Area of Application or electives

#### Winter Semester

COOP\*4000 Work Term 4

8-month work term in conjunction with COOP\*5000

#### Summer Semester

COOP\*5000 Work Term 5

8-month work term in conjunction with COOP\*4000

#### Semester 7 - Fall

CIS\*4150 [0.50] Software Reliability and Testing  
 CIS\*4250 [0.50] Software Design V  
 CIS\*4300 [0.50] Human Computer Interaction

1.00 credits in the Area of Application or electives

#### Semester 8 - Winter

1.50 credits in the Area of Application or electives

0.50 credits in CIS at 3000 level or above

0.50 credits in CIS at the 4000 level

## Bachelor of Engineering [B.Eng.]

### Program Information

#### Objectives of the Program

Students in this program obtain a liberal engineering education, which includes a comprehensive core of science, mathematics and engineering science that provides a strong foundation for engineering design and analysis. This enables students to undertake the solution of engineering problems in the areas of biological, biomedical, computer, engineering systems and computing, environmental, mechanical and water resources. Core subjects, combined with elective opportunities, provide an understanding of the connection between engineering and science, coupled with the interdisciplinary skills needed to address the problems and challenges faced by engineers in society today.

The curriculum includes a strong emphasis on engineering design. Students engage in engineering design throughout the program, and gain experience in computer aided design and modeling, conceptual design and physical construction. Emphasis is on teamwork and communications skills, as well as working on interdisciplinary projects.

Career opportunities are open in many segments of the economy. Examples are: consulting services to municipalities, utilities and industry; resource agencies in advisory, regulatory, planning and utilization; service industries of construction, power and water supply and public health; manufacturing, design of computer and control systems, hardware and software development; mechatronics and emerging energy systems; medical devices, pharmaceutical and food industries and industrial ergonomics; academic research and graduate studies within and without the field of engineering.

Many engineers assume management responsibilities after gaining experience in design, development and operations. The balance provided by liberal arts and engineering education allows graduates to enjoy a great deal of career mobility.

#### Accreditation

The baccalaureate degree programs in all engineering programs are accredited by the Canadian Engineering Accreditation Board of Engineers Canada. Graduates from accredited engineering programs have the educational requirements to apply for membership in the Professional Engineers Ontario (PEO) and other provinces after a number of years of acceptable engineering experience and successful completion of a PEO examination in engineering law and ethics.

#### Requirements of the Program

Students combine their required courses in mathematics, physical sciences and engineering with additional credits providing the opportunity for specialization in: one of the programs; complementary studies courses; and elective subjects. A minimum of 23.50 credits must be obtained for the following programs: Biological Engineering, Engineering Systems and Computing, Environmental Engineering, Mechanical Engineering, and Water Resources Engineering. A minimum of 23.25 credits must be obtained for Biomedical Engineering. A minimum of 24.00 credits must be obtained for Computer Engineering. At least 3.00 credits must be complementary studies, which consist of courses in the social sciences, arts, management, engineering economics and communication. They complement the technical content of the curriculum. All credits are selected according to the schedule of studies for the student's chosen program. Restrictions apply to the number of non-core credits which may be at the 1000 level. Further information on approved courses may be obtained from the B.Eng. Program Guide available from the director or program counsellor of the School of Engineering

#### Programs

Entry into a specific B.Eng. program is done two ways. Students can select their desired program of study (major) at the time of application. If accepted, students will be given an offer to their program of choice. Students also have the option of selecting the Undeclared First Year (Undeclared Stream) entry point due to the similarities of first year. Students in the Undeclared Stream then normally select their specific program of study during course selection for Semester II. Students in the Undeclared stream are strongly encouraged to meet with their Program Counsellor during Semester I. The School's Associate Director - Undergraduate Affairs or designate approve program selection during the semester add periods. There are no enrollment caps on any program, so students are free to select their programs of choice. Students wanting to make a switch in majors after the above dates are free to do so with prior approval, but will be off sequence and may be required to take additional courses.

The available programs are:

**Undeclared First Year:** Students selecting this entry point are required to select one of the B.Eng. Majors at the time of course selection in Semester II.

**Biological Engineering** - the application of engineering to the control and management of biological processes, environments, and human factors in engineering design.

**Biomedical Engineering** - the application of engineering to health and medicine.

**Computer Engineering** - the application of engineering to the design, fabrication, and testing of computing machines and computer systems.

**Engineering Systems and Computing** - the application of engineering to the design, operation and management of data sensing, transmission and processing systems, and of control systems.

**Environmental Engineering** - the application of engineering to protect and restore the environment, through the prevention and treatment of gaseous, liquid and solid wastes.

**Mechanical Engineering** - The application of engineering to the design, manufacturing and control of mechanical and electro-mechanical equipment, systems and devices.

**Water Resources Engineering** - the application of engineering to the control and management of water and soil resources to meet human needs while sustaining the natural environment.

The schedule of studies for each program is provided below but guidance in the selection of appropriate courses is available from the program counsellor of the School of Engineering.

#### Additional Course Requirements

Students lacking specific subject requirements are advised to consult the Recommendations and Notes in Section IV--Admission Information-B.Eng..

#### Continuation of Study

Students are advised to consult the regulations for continuation of study within the program which are outlined in detail in Section VIII, Undergraduate Degree Regulation & Procedures. Students will be ineligible to continue in the B.Eng. program and will not be readmitted to the degree program if the same course is failed three times.

Normally, students in the B.Eng. program will be permitted only one supplemental privilege during their studies. It will usually be granted for 3000 or 4000 level courses only.

#### Conditions for Graduation

To qualify for the degree the student must complete the courses required for a B.Eng. program, obtaining a minimum of 23.50 credits for one of: Biological Engineering, Environmental Engineering, Mechanical Engineering, Engineering Systems and Computing Engineering; or 23.25 credits for Biomedical Engineering; or 24.00 credits for Computer Engineering, and must achieve an overall minimum cumulative average of at least 60% and a minimum cumulative average of at least 60% in all ENGG courses.

#### Co-operative Education

Students studying for the B.Eng. degree may participate in a Co-operative Education program following the completion of the first 4 semesters of study. The Co-operative Education program consists of a minimum of 4 semesters of experience in industry with employers who participate in the program. Reports and assignments are graded by a faculty supervisor with assistance from the employer. Evaluations of Co-op semesters are recorded on the student's academic record. The Co-operative Education program provides an excellent opportunity for students to obtain work experience in industry directly related to their field of study. Interested students should consult their program counsellor.

Students wishing to participate in the Co-operative Education program should indicate their intention to do so by applying for admission to the Co-op program on entrance. Following the completion of semester 2, in-course applicants will be considered for admission to the Co-op program if space permits.

Successful applicants will:

1. have a minimum cumulative average of 70% in semesters 1 and 2
2. have successfully completed all of the credits required in the schedule of studies for semesters 1 and 2
3. be employable in Canada or be in possession of an appropriate work-permit for Co-op students)
4. have obtained the approval of their Co-op advisor in the school to participate in the program. The Co-op advisor's approval will signify that the schedule of work semesters in the Co-op program as planned by the student is compatible with the schedule of studies in the program in which the student is enrolled.
5. completion of COOP\*1100 is a requirement for entry into the first work term.

Please refer to Co-operative Education Program for Admission requirements into the Co-op Program.

#### B. Eng. Co-op Work Term Schedule

Semester	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5
Fall	1	3	5	6	work
Winter	2	4	work	7	8
Summer		work	work	work	

All candidates must complete a minimum of 4 of the preceding 5 work terms with at least one work-term in each of a Fall, Winter and Summer semester. Students are eligible to participate in a maximum of two (2) work terms commencing in the summer and must follow the academic work schedule as outlined in the Co-operative Education & Career Services website.

#### Undeclared First Year Entry - B.Eng. Program Regular and Co-op

##### School of Engineering, College of Physical and Engineering Science

##### Semester 1

CHEM*1040	[0.50]	General Chemistry I
CIS*1500	[0.50]	Introduction to Programming
ENGG*1100	[0.75]	Engineering and Design I

MATH*1200	[0.50]	Calculus I
One of:		
ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

**Note:** ENGG\*1210 or HIST\*1250 must be taken in semester 1; the remaining course must be taken in semester 2.

### Semester 2 Regular or Co-op (Biological Engineering, Biomedical Engineering, Environmental Engineering, Water Resources Engineering)

CHEM*1050	[0.50]	General Chemistry II
ENGG*1500	[0.50]	Engineering Analysis
MATH*1210	[0.50]	Calculus II
PHYS*1130	[0.50]	Physics with Applications
One of:		
ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

### Semester 2 Regular or Co-op (Computer Engineering, Engineering Systems and Computing)

CIS*2500	[0.50]	Intermediate Programming
ENGG*1500	[0.50]	Engineering Analysis
MATH*1210	[0.50]	Calculus II
PHYS*1010	[0.50]	Introductory Electricity and Magnetism
PHYS*1130	[0.50]	Physics with Applications
One of:		

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

### Semester 2 Regular or Co-op (Mechanical Engineering)

ENGG*1500	[0.50]	Engineering Analysis
MATH*1210	[0.50]	Calculus II
PHYS*1010	[0.50]	Introductory Electricity and Magnetism
PHYS*1130	[0.50]	Physics with Applications
One of:		

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

### Biomedical Engineering Program Regular and Co-op (BME/BME:C)

#### School of Engineering, College of Physical and Engineering Science

Biomedical Engineering is a field of engineering that deals with health and medicine. (e.g.: electronic and mechanical devices used on biological materials, animals and humans, medical implants and instruments, ergonomics, bioinstrumentation, imaging and pharmacology). Graduates in Biomedical engineering are able to apply mathematical, scientific and engineering principles to a wide variety of fields and find employment across the private and public sectors of the health care industry. The program provides students with a common base of knowledge essential to engineering, and then allows them to select from a menu of electives to attain a degree of specialization in one of three areas, or to choose electives which broaden their general knowledge base. Elective concentrations are available in the areas of biomechanics; biosignal processing; and pharmaceuticals. The program is built around the concept of interdisciplinary application of engineering principles to health related problems.

#### Major (Honours Program)

##### Semester 1 - Regular or Co-op

CHEM*1040	[0.50]	General Chemistry I
CIS*1500	[0.50]	Introduction to Programming
ENGG*1100	[0.75]	Engineering and Design I
MATH*1200	[0.50]	Calculus I
One of:		

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

**Note:** ENGG\*1210 or HIST\*1250 must be taken in semester 1; the remaining course must be taken in semester 2.

##### Semester 2 - Regular or Co-op

CHEM*1050	[0.50]	General Chemistry II
ENGG*1500	[0.50]	Engineering Analysis
MATH*1210	[0.50]	Calculus II
PHYS*1130	[0.50]	Physics with Applications
One of:		

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

##### Semester 3 - Regular or Co-op

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
COOP*1100	[0.00]	Introduction to Co-operative Education
ENGG*2160	[0.50]	Engineering Mechanics II
ENGG*2400	[0.50]	Engineering Systems Analysis

MATH*2270	[0.50]	Applied Differential Equations
One of:		

ENGG*2100	[0.75]	Engineering and Design II
STAT*2120	[0.50]	Probability and Statistics for Engineers
One of:		

ENGG*2120	[0.50]	Material Science
ENGG*2230	[0.50]	Fluid Mechanics

**Note:** ENGG\*2100 or STAT\*2120 must be taken in semester 3; the remaining course must be taken in semester 4.

**Note:** ENGG\*2120 or ENGG\*2230 must be taken in semester 3; the remaining course must be taken in semester 4.

##### Semester 4 - Regular or Co-op

BIOL*1080	[0.50]	Biological Concepts of Health
BIOM*2000	[0.50]	Concepts in Human Physiology
ENGG*2450	[0.50]	Electric Circuits
MATH*2130	[0.50]	Numerical Methods
One of:		

ENGG*2100	[0.75]	Engineering and Design II
STAT*2120	[0.50]	Probability and Statistics for Engineers
One of:		

ENGG*2120	[0.50]	Material Science
ENGG*2230	[0.50]	Fluid Mechanics

**Note:** Students pursuing the pharmaceutical series of electives may select ENGG\*2660 in Semester 4. If ENGG\*2660 is selected, students must select BIOM\*2000 in semester 6 in place of a 0.50 restricted elective.

##### Semester 5 - Regular or Co-op

BIOM*3010	[0.50]	Biomedical Comparative Anatomy
ENGG*3240	[0.50]	Engineering Economics
ENGG*3260	[0.50]	Thermodynamics
ENGG*3390	[0.50]	Signal Processing
ENGG*3450	[0.50]	Electronic Devices

0.50 restricted electives

##### Semester 6 Regular / Semester 7 Co-op

ENGG*3100	[0.75]	Engineering and Design III
ENGG*3170	[0.50]	Biomaterials
ENGG*3410	[0.50]	Systems and Control Theory
ENGG*3430	[0.50]	Heat and Mass Transfer
PATH*3610	[0.50]	Principles of Disease

0.50 restricted electives

##### Semester 7 Regular / Semester 6 Co-op

ENGG*4000	[0.00]	Proposal for Engineering Design IV
ENGG*4390	[0.75]	Bio-instrumentation Design

2.00 restricted electives

**Note:** BME:C students must register for ENGG\*4000 in the final co-op work term semester immediately preceding registration in ENGG\*4180.

##### Semester 8 (Winter) - Regular or Co-op

ENGG*4180	[1.00]	Biomedical Engineering Design IV
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1.75 restricted electives

#### Restricted Electives (see Program Guide for more information)

A maximum of 1.50 credits at the 1000 level is allowed for elective requirements

- 2.00 credits in Complementary Studies (Students need to take 0.50 credits from each of the three sub-lists noted in the Program Guide. The remaining 0.50 credits can be taken from any Complementary Studies sub-list.)
- 0.75 credits in Biomedical Engineering design electives
- 2.00 credits in Biomedical Engineering electives

### Biological Engineering Program Regular and Co-op (BIOE/BIOE:C)

#### School of Engineering, College of Physical and Engineering Science

Students interested in problems requiring the application of knowledge from both the biological sciences and engineering will find a challenge as a Biological Engineer. This field of engineering relates to the control of technological processes with the aim of enhancing human, animal and plant life. The program encompasses the technologies of biotechnology, waste management, food engineering, and ergonomics. For example, a Biological Engineer concentrating on biotechnology might design and manage bioreactors to improve their productivity. A career in Biomedical Engineering, which requires graduate work beyond the Bachelor's degree, involves designing instruments and diagnostic techniques to be used in the practice of medicine, developing prosthetic devices, and applying engineering techniques to the study of physiological systems.

#### Major (Honours Program)

##### Semester 1 - Regular or Co-op

CHEM*1040	[0.50]	General Chemistry I
CIS*1500	[0.50]	Introduction to Programming
ENGG*1100	[0.75]	Engineering and Design I
MATH*1200	[0.50]	Calculus I



One of:

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

**Note:** ENGG\*1210 or HIST\*1250 must be taken in semester 1; the remaining course must be taken in semester 2.

### Semester 2 - Regular or Co-op

CHEM*1050	[0.50]	General Chemistry II
ENGG*1500	[0.50]	Engineering Analysis
MATH*1210	[0.50]	Calculus II
PHYS*1130	[0.50]	Physics with Applications

One of:

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

### Semester 3 - Regular or Co-op

COOP*1100	[0.00]	Introduction to Co-operative Education
BIOL*1080	[0.50]	Biological Concepts of Health
ENGG*2400	[0.50]	Engineering Systems Analysis
MATH*2270	[0.50]	Applied Differential Equations

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

One of:

ENGG*2100	[0.75]	Engineering and Design II
STAT*2120	[0.50]	Probability and Statistics for Engineers

One of:

ENGG*2120	[0.50]	Material Science
ENGG*2230	[0.50]	Fluid Mechanics

**Note:** ENGG\*2100 or STAT\*2120 must be taken in semester 3; the remaining course must be taken in semester 4.

**Note:** ENGG\*2120 or ENGG\*2230 must be taken in semester 3; the remaining course must be taken in semester 4.

### Semester 4 - Regular or Co-op

BIOC*2580	[0.50]	Introduction to Biochemistry
ENGG*2450	[0.50]	Electric Circuits
ENGG*2660	[0.50]	Biological Engineering Systems I
MATH*2130	[0.50]	Numerical Methods

One of:

ENGG*2100	[0.75]	Engineering and Design II
STAT*2120	[0.50]	Probability and Statistics for Engineers

One of:

ENGG*2120	[0.50]	Material Science
ENGG*2230	[0.50]	Fluid Mechanics

### Semester 5 - Regular or Co-op

ENGG*3160	[0.50]	Biological Engineering Systems II
ENGG*3240	[0.50]	Engineering Economics
ENGG*3260	[0.50]	Thermodynamics
ENGG*3450	[0.50]	Electronic Devices
ENGG*3830	[0.50]	Bio-Process Engineering

0.50 restricted electives

### Semester 6 Regular / Semester 7 Co-op

ENGG*3100	[0.75]	Engineering and Design III
ENGG*3170	[0.50]	Biomaterials
ENGG*3410	[0.50]	Systems and Control Theory
ENGG*3430	[0.50]	Heat and Mass Transfer

0.50 restricted electives

### Semester 7 Regular / Semester 6 Co-op

ENGG*4000	[0.00]	Proposal for Engineering Design IV
ENGG*4390	[0.75]	Bio-instrumentation Design

2.75 restricted electives

**Note:** BIOE:C students must register for ENGG\*4000 in the final co-op work term semester immediately preceding registration in ENGG\*4110.

### Semester 8 (Winter) - Regular or Co-op

ENGG*4110	[1.00]	Biological Engineering Design IV
ENGG*4280	[0.75]	Digital Process Control Design

1.00 restricted electives

### Restricted Electives (see Program Guide for more information)

A maximum of 1.50 credits at the 1000 level is allowed for elective requirements.

- 2.00 credits in Complementary Studies (Students need to take 0.50 credits from each of the three sub-lists noted in the Program Guide. The remaining 0.50 credits can be taken from any Complementary Studies sub-list.)
- 0.75 credits in required Design electives
- 1.00 credits in Biological Engineering electives
- 1.00 credits in Free electives

## Computer Engineering Program Regular and Co-op (CENG/CENG:C)

### School of Engineering, College of Physical and Engineering Science

Computer Engineering is a field of engineering that focuses on the design and organization of computer systems. Graduates in Computer Engineering are able to apply mathematical, scientific and engineering principles to design and integrate computer systems suitable for applications in a wide range of fields. The program provides students with a common base of knowledge essential to computer engineering and then allows them to select from a menu of electives to attain a degree of specialization in one of four areas or to choose electives to broaden their knowledge base. Elective concentrations are available in areas of Electronic Design automation, Software Design, Artificial Intelligence and Robotics, and Microsystems.

### Major (Honours Program)

#### Semester 1 - Regular or Co-op

CHEM*1040	[0.50]	General Chemistry I
CIS*1500	[0.50]	Introduction to Programming
ENGG*1100	[0.75]	Engineering and Design I
MATH*1200	[0.50]	Calculus I

One of:

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

**Note:** ENGG\*1210 or HIST\*1250 must be taken in semester 1; the remaining course must be taken in semester 2.

#### Semester 2 - Regular or Co-op

CIS*2500	[0.50]	Intermediate Programming
ENGG*1500	[0.50]	Engineering Analysis
MATH*1210	[0.50]	Calculus II
PHYS*1010	[0.50]	Introductory Electricity and Magnetism
PHYS*1130	[0.50]	Physics with Applications

One of:

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

#### Semester 3 - Regular or Co-op

CIS*2430	[0.50]	Object Oriented Programming
CIS*2520	[0.50]	Data Structures
CIS*2910	[0.50]	Discrete Structures in Computing II
COOP*1100	[0.00]	Introduction to Co-operative Education
ENGG*2400	[0.50]	Engineering Systems Analysis
ENGG*2410	[0.50]	Digital Systems Design Using Descriptive Languages
MATH*2270	[0.50]	Applied Differential Equations

#### Semester 4 - Regular or Co-op

ENGG*2100	[0.75]	Engineering and Design II
ENGG*2450	[0.50]	Electric Circuits
ENGG*3380	[0.50]	Computer Organization and Design
MATH*2130	[0.50]	Numerical Methods
STAT*2120	[0.50]	Probability and Statistics for Engineers

0.50 restricted electives (CIS\*2750 recommended for students interested in the software engineering stream)

#### Semester 5 - Regular or Co-op

ENGG*2120	[0.50]	Material Science
ENGG*3240	[0.50]	Engineering Economics
ENGG*3390	[0.50]	Signal Processing
ENGG*3450	[0.50]	Electronic Devices
ENGG*3640	[0.50]	Microcomputer Interfacing

0.50 restricted electives

#### Semester 6 - Regular / Semester 7 - Co-op

CIS*3110	[0.50]	Operating Systems I
CIS*3490	[0.50]	The Analysis and Design of Computer Algorithms
ENGG*3100	[0.75]	Engineering and Design III
ENGG*3210	[0.50]	Communication Systems
ENGG*3410	[0.50]	Systems and Control Theory

0.50 restricted electives

#### Semester 7 - Regular / Semester 6 - Co-op

ENGG*4000	[0.00]	Proposal for Engineering Design IV
ENGG*4080	[0.50]	Micro and Nano-Scale Electronics
ENGG*4420	[0.75]	Real-time Systems Design
ENGG*4450	[0.50]	Large-Scale Software Architecture Engineering

1.00 restricted electives

**Note:** CENG:C students must register for ENGG\*4000 in the final co-op work term semester immediately preceding registration in ENGG\*4170.

#### Semester 8 - Regular or Co-op

ENGG*4170	[1.00]	Computer Engineering Design IV
ENGG*4540	[0.50]	Advanced Computer Architecture

ENGG\*4550 [0.50] VLSI Digital Design  
1.00 electives

### Restricted Electives (see Program Guide for more information)

A maximum of 1.50 credits at the 1000 level is allowed for elective requirements

- 2.00 credits in Complimentary Studies (Students need to take 0.50 credits from each of the three sub-lists noted in the Program Guide. The remaining 0.50 credits can be taken from any Complimentary Studies sub-list)
- 1.50 credits in Computer engineering electives.

### Engineering Systems and Computing Program Regular and Co-op (ESC/ESC:C)

#### School of Engineering, College of Physical and Engineering Science

In the last quarter century, the computer has grown so rapidly in importance that engineering, science, business and industry could not function without it. With this growth, a need has evolved for specialists who can incorporate computers and information into complex industrial processes. The Engineering Systems and Computing program has been conceived to satisfy this need. Graduates from this program will have, in addition to the basic engineering skills, the ability to identify application areas where computer technology represents the optimum solution, specify appropriate software for process control, data reduction and/or expert system implementation and integrate the computer into the overall system application.

#### Major (Honours Program)

##### Semester 1 - Regular or Co-op

CHEM\*1040 [0.50] General Chemistry I  
CIS\*1500 [0.50] Introduction to Programming  
ENGG\*1100 [0.75] Engineering and Design I  
MATH\*1200 [0.50] Calculus I

One of:

ENGG\*1210 [0.50] Engineering Mechanics I  
HIST\*1250 [0.50] Science and Technology in a Global Context

**Note:** ENGG\*1210 or HIST\*1250 must be taken in semester 1; the remaining course must be taken in semester 2.

##### Semester 2 - Regular or Co-op

CIS\*2500 [0.50] Intermediate Programming  
ENGG\*1500 [0.50] Engineering Analysis  
MATH\*1210 [0.50] Calculus II  
PHYS\*1010 [0.50] Introductory Electricity and Magnetism  
PHYS\*1130 [0.50] Physics with Applications

One of:

ENGG\*1210 [0.50] Engineering Mechanics I  
HIST\*1250 [0.50] Science and Technology in a Global Context

##### Semester 3 - Regular or Co-op

CIS\*2430 [0.50] Object Oriented Programming  
CIS\*2520 [0.50] Data Structures  
COOP\*1100 [0.00] Introduction to Co-operative Education  
ENGG\*2400 [0.50] Engineering Systems Analysis  
ENGG\*2410 [0.50] Digital Systems Design Using Descriptive Languages  
MATH\*2270 [0.50] Applied Differential Equations

One of:

ENGG\*2120 [0.50] Material Science  
ENGG\*2230 [0.50] Fluid Mechanics

**Note:** ENGG\*2120 or ENGG\*2230 must be taken in semester 3; the remaining course must be taken in semester 4.

##### Semester 4 - Regular or Co-op

ENGG\*2100 [0.75] Engineering and Design II  
ENGG\*2450 [0.50] Electric Circuits  
MATH\*2130 [0.50] Numerical Methods  
STAT\*2120 [0.50] Probability and Statistics for Engineers

One of:

ENGG\*2120 [0.50] Material Science  
ENGG\*2230 [0.50] Fluid Mechanics

0.50 restricted electives

##### Semester 5 - Regular or Co-op

ENGG\*3260 [0.50] Thermodynamics  
ENGG\*3390 [0.50] Signal Processing  
ENGG\*3450 [0.50] Electronic Devices  
ENGG\*3640 [0.50] Microcomputer Interfacing

1.00 restricted electives

##### Semester 6 - Regular / Semester 7 - Co-op

ENGG\*3100 [0.75] Engineering and Design III  
ENGG\*3130 [0.50] Modelling Complex Systems  
ENGG\*3410 [0.50] Systems and Control Theory  
ENGG\*3430 [0.50] Heat and Mass Transfer

0.50 or 0.75 restricted electives

##### Semester 7 - Regular / Semester 6 - Co-op

ENGG\*3240 [0.50] Engineering Economics  
ENGG\*4000 [0.00] Proposal for Engineering Design IV  
ENGG\*4420 [0.75] Real-time Systems Design  
ENGG\*4450 [0.50] Large-Scale Software Architecture Engineering

1.00 or 1.25 restricted electives

**Note:** ESC:C students must register for ENGG\*4000 in the final co-op work term semester immediately preceding registration in ENGG\*4120.

##### Semester 8 - Regular or Co-op

ENGG\*4120 [1.00] Engineering Systems and Computing Design IV  
ENGG\*4280 [0.75] Digital Process Control Design  
1.00 electives

### Restricted Electives (see Program Guide for more information)

A maximum of 1.50 credits at the 1000 level is allowed for elective requirements.

- 2.00 credits in Complementary Studies (Students need to take 0.50 credits from each of the three sub-lists noted in the Program Guide. The remaining 0.50 credits can be taken from any Complementary Studies sub-list.)
- 1.50 credits in ES&C Engineering electives
- 0.75 credits in ES&C Engineering Design electives

### Environmental Engineering Program Regular and Co-op (ENVE/ENVE:C)

#### School of Engineering, College of Physical and Engineering Science

The degradation of the environment is a concern shared by citizens, government agencies, non governmental agencies and businesses. The Environmental Engineering program offered by the School of Engineering provides graduates with design and engineering skills to minimize and prevent the impact of human activities on water, soil and air systems. Both simple and innovative solutions are part of the tool box. Graduates will also creatively integrate humanistic and social perspectives in their solutions.

#### Major (Honours Program)

##### Semester 1 - Regular or Co-op

CHEM\*1040 [0.50] General Chemistry I  
CIS\*1500 [0.50] Introduction to Programming  
ENGG\*1100 [0.75] Engineering and Design I  
MATH\*1200 [0.50] Calculus I

One of:

ENGG\*1210 [0.50] Engineering Mechanics I  
HIST\*1250 [0.50] Science and Technology in a Global Context

**Note:** ENGG\*1210 or HIST\*1250 must be taken in semester 1; the remaining course must be taken in semester 2.

##### Semester 2 - Regular or Co-op

CHEM\*1050 [0.50] General Chemistry II  
ENGG\*1500 [0.50] Engineering Analysis  
MATH\*1210 [0.50] Calculus II  
PHYS\*1130 [0.50] Physics with Applications

One of:

ENGG\*1210 [0.50] Engineering Mechanics I  
HIST\*1250 [0.50] Science and Technology in a Global Context

##### Semester 3 - Regular or Co-op

COOP\*1100 [0.00] Introduction to Co-operative Education  
ENGG\*2400 [0.50] Engineering Systems Analysis  
MATH\*2270 [0.50] Applied Differential Equations

0.50 restricted electives

One of:

BIOL\*1090 [0.50] Introduction to Molecular and Cellular Biology  
MICR\*2420 [0.50] Introduction to Microbiology

One of:

ENGG\*2100 [0.75] Engineering and Design II  
STAT\*2120 [0.50] Probability and Statistics for Engineers

One of:

ENGG\*2120 [0.50] Material Science  
ENGG\*2230 [0.50] Fluid Mechanics

**Note:** ENGG\*2100 or STAT\*2120 must be taken in semester 3; the remaining course must be taken in semester 4.

**Note:** ENGG\*2120 or ENGG\*2230 must be taken in semester 3; the remaining course must be taken in semester 4.

##### Semester 4 - Regular or Co-op

ENGG\*2450 [0.50] Electric Circuits  
ENGG\*2560 [0.50] Environmental Engineering Systems  
MATH\*2130 [0.50] Numerical Methods

One of:

ENGG\*2100 [0.75] Engineering and Design II  
STAT\*2120 [0.50] Probability and Statistics for Engineers

One of:

ENGG*2120	[0.50]	Material Science
ENGG*2230	[0.50]	Fluid Mechanics

0.50 restricted electives

**Semester 5 - Regular or Co-op**

ENGG*3180	[0.50]	Air Quality
ENGG*3240	[0.50]	Engineering Economics
ENGG*3260	[0.50]	Thermodynamics
ENGG*3590	[0.50]	Water Quality
ENGG*3650	[0.50]	Hydrology
ENGG*3670	[0.50]	Soil Mechanics

**Semester 6 Regular / Semester 7 Co-op**

ENGG*3100	[0.75]	Engineering and Design III
ENGG*3220	[0.50]	Groundwater Engineering
ENGG*3410	[0.50]	Systems and Control Theory
ENGG*3430	[0.50]	Heat and Mass Transfer
ENGG*3470	[0.50]	Mass Transfer Operations

0.50 restricted electives

**Semester 7 Regular / Semester 6 Co-op**

ENGG*4000	[0.00]	Proposal for Engineering Design IV
ENGG*4340	[0.50]	Solid and Hazardous Waste Management
ENGG*4370	[0.75]	Urban Water Systems Design

1.50 restricted electives

**Note:** ENVE:C students must register for ENGG\*4000 in the final co-op work term semester immediately preceding registration in ENGG\*4130.

**Semester 8 - Regular or Co-op**

ENGG*4130	[1.00]	Environmental Engineering Design IV
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2.00 restricted electives

**Restricted Electives (see Program Guide for more information)**

A maximum of 1.50 credits at the 1000 level is allowed for elective requirements.

- 2.00 credits in Complementary Studies (Students need to take 0.50 credits from each of the three sub-lists noted in the Program Guide. The remaining 0.50 credits can be taken from any Complementary Studies sub-list.)
- 3.00 credits in Environmental Engineering electives

**Minor (Honours Program)**

Students must be registered in the B.Eng degree program to apply for a minor in Environmental Engineering.

The minor can be satisfied by taking the following additional courses:

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*3360	[0.50]	Environmental Chemistry and Toxicology
ENGG*2560	[0.50]	Environmental Engineering Systems
ENGG*3180	[0.50]	Air Quality
ENGG*3590	[0.50]	Water Quality
GEOG*1300	[0.50]	Introduction to the Biophysical Environment
MICR*2420	[0.50]	Introduction to Microbiology

Three of:

ENGG*3470	[0.50]	Mass Transfer Operations
ENGG*4340	[0.50]	Solid and Hazardous Waste Management
ENGG*4760	[0.50]	Biological Wastewater Treatment Design
ENGG*4770	[0.50]	Physical & Chemical Water and Wastewater Treatment Design
ENGG*4810	[0.50]	Control of Atmospheric Particulates
ENGG*4820	[0.50]	Atmospheric Emission Control: Combustion Systems

*Students must incorporate an environmental application as part of their capstone design course worth 1.00 credits in the final semester of their B.Eng major program.*

**Food Engineering (FENG)****School of Engineering, College of Physical and Engineering Science****Minor (Honours Program)**

Students must be registered in the B.Eng. degree program to apply for a Minor in Food Engineering.

The minor can be satisfied by taking the following additional courses:

ACCT*1220	[0.50]	Introductory Financial Accounting
BIOC*2580	[0.50]	Introduction to Biochemistry
ENGG*2660	[0.50]	Biological Engineering Systems I
ENGG*3830	[0.50]	Bio-Process Engineering
FOOD*2150	[0.50]	Introduction to Nutritional and Food Science
MICR*1020	[0.50]	Fundamentals of Applied Microbiology

One of:

ENGG*4300	[0.75]	Food Processing Engineering Design
ENGG*4380	[0.75]	Bioreactor Design

Two of:

FOOD*4070	[0.50]	Food Packaging
FOOD*4110	[0.50]	Meat and Poultry Processing
MCS*3010	[0.50]	Quality Management

One of:

FOOD*3160	[0.75]	Food Processing I
FOOD*4520	[0.50]	Utilization of Cereal Grains for Human Food

One of:

FOOD*2400	[0.50]	Introduction to Food Chemistry
FOOD*3010	[0.50]	Food Chemistry
FOOD*3230	[0.75]	Food Microbiology
FOOD*3260	[0.50]	Industrial Microbiology

*\*Students must incorporate a food engineering application as part of their capstone design course worth 1.0 credits in the final semester of their B.Eng. major program.*

**NOTE:** Courses taken for the minors are credited to appropriate elective areas.

**Mechanical Engineering Program Regular and Co-op (MECH/MECH:C)****School of Engineering, College of Physical and Engineering Science**

Mechanical Engineering at Guelph is built around concepts of sustainability and sustainable design to equip graduates to tackle issues associated with emerging technologies. Graduates in mechanical engineering are able to apply mathematical, scientific and engineering principles to a wide variety of fields and find employment across the private and public sectors. The program provides students with a common base of knowledge essential to mechanical engineering, and then allows them to select from a menu of electives to attain a degree of specialization in one of five areas, or to choose electives which broaden their general knowledge base. Elective concentrations are available in the areas of wind and solar energy, food and beverage engineering, mechatronics, manufacturing system design and biomechanics.

**Major (Honours Program)****Semester 1 - Regular or Co-op**

CHEM*1040	[0.50]	General Chemistry I
CIS*1500	[0.50]	Introduction to Programming
ENGG*1100	[0.75]	Engineering and Design I
MATH*1200	[0.50]	Calculus I

One of:

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

**Note:** One of ENGG\*1210 and HIST\*1250 must be taken in semester 1; the remaining course must be taken in semester 2.

**Semester 2 - Regular or Co-op**

ENGG*1500	[0.50]	Engineering Analysis
MATH*1210	[0.50]	Calculus II
PHYS*1010	[0.50]	Introductory Electricity and Magnetism
PHYS*1130	[0.50]	Physics with Applications

One of:

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

**Semester 3 - Regular or Co-op**

COOP*1100	[0.00]	Introduction to Co-operative Education
ENGG*1070	[0.25]	Occupational Health and Safety
ENGG*2160	[0.50]	Engineering Mechanics II
ENGG*2400	[0.50]	Engineering Systems Analysis
MATH*2270	[0.50]	Applied Differential Equations

One of:

ENGG*2100	[0.75]	Engineering and Design II
STAT*2120	[0.50]	Probability and Statistics for Engineers

One of:

ENGG*2120	[0.50]	Material Science
ENGG*2230	[0.50]	Fluid Mechanics

**Note:** ENGG\*2100 or STAT\*2120 must be taken in semester 3; the remaining course must be taken in semester 4.

**Note:** ENGG\*2120 or ENGG\*2230 must be taken in semester 3; the remaining course must be taken in semester 4.

**Semester 4 - Regular or Co-op**

ENGG*2180	[0.50]	Introduction to Manufacturing Processes
ENGG*2340	[0.50]	Kinematics and Dynamics
ENGG*2450	[0.50]	Electric Circuits
MATH*2130	[0.50]	Numerical Methods

One of:

ENGG*2100	[0.75]	Engineering and Design II
STAT*2120	[0.50]	Probability and Statistics for Engineers

One of:

ENGG*2120	[0.50]	Material Science
ENGG*2230	[0.50]	Fluid Mechanics

**Semester 5 - Regular or Co-op**

ENGG*3140	[0.50]	Mechanical Vibration
ENGG*3240	[0.50]	Engineering Economics
ENGG*3260	[0.50]	Thermodynamics

ENGG*3280	[0.75]	Machine Design
ENGG*3510	[0.50]	Electromechanical Devices

0.50 restricted electives

### Semester 6 - Regular / Semester 7 - Co-op

ENGG*3100	[0.75]	Engineering and Design III
ENGG*3370	[0.50]	Applied Fluids and Thermodynamics
ENGG*3410	[0.50]	Systems and Control Theory
ENGG*3430	[0.50]	Heat and Mass Transfer

1.00 restricted electives

### Semester 7 - Regular / Semester 6 - Co-op

ENGG*4000	[0.00]	Proposal for Engineering Design IV
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2.50 restricted electives

**Note:** MECH:C students must register for ENGG\*4000 in the final co-op work term semester immediately preceding registration in ENGG\*4160.

### Semester 8 - Regular or Co-op

ENGG*4160	[1.00]	Mechanical Engineering Design IV
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2.25 restricted electives

### Restricted Electives (see Program Guide for more information)

A maximum of 1.50 credits at the 1000 level is allowed for elective requirements.

- 2.00 credits in Complementary Studies (Students need to take 0.50 credits from each of the three sub-lists noted in the Program Guide. The remaining 0.50 credits can be taken from any Complementary Studies sub-list.)
- 0.75 credits in Mechanical Engineering Design electives.
- A minimum of 3.50 credits in Mechanical Engineering electives. Specific credit requirements vary by the mechanical engineering design elective chosen. Please consult the Program Guide for further information on the prerequisite requirements specific to each mechanical engineering design elective.

## Water Resources Engineering Program Regular and Co-op (WRE/WRE:C)

### School of Engineering, College of Physical and Engineering Science

Water resources engineering focuses on the use and management of land and water resources in rural and urban watersheds. The hydrologic and hydraulic behaviour of watershed flow systems is combined with engineering science and ecological principles in the design of water management systems and strategies. Water management includes flood prevention, warning and control; drainage; design of natural channels; irrigation; and erosion prevention and control. The supply of water for municipal, industrial and agricultural purposes is considered in the context of resource conservation. Identification of potential point and diffused sources of pollutants is used to develop efficient, environmentally sustainable and economical methods to preserve high-quality water to sustain human life and water-dependent ecosystems.

### Major (Honours Program)

#### Semester 1 - Regular or Co-op

CHEM*1040	[0.50]	General Chemistry I
CIS*1500	[0.50]	Introduction to Programming
ENGG*1100	[0.75]	Engineering and Design I
MATH*1200	[0.50]	Calculus I

One of:

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

**Note:** One of ENGG\*1210 and HIST\*1250 must be taken in semester 1; the remaining course must be taken in semester 2.

#### Semester 2 - Regular or Co-op

CHEM*1050	[0.50]	General Chemistry II
ENGG*1500	[0.50]	Engineering Analysis
MATH*1210	[0.50]	Calculus II
PHYS*1130	[0.50]	Physics with Applications

One of:

ENGG*1210	[0.50]	Engineering Mechanics I
HIST*1250	[0.50]	Science and Technology in a Global Context

#### Semester 3 - Regular or Co-op

COOP*1100	[0.00]	Introduction to Co-operative Education
ENGG*2400	[0.50]	Engineering Systems Analysis
GEOG*2000	[0.50]	Geomorphology
MATH*2270	[0.50]	Applied Differential Equations

One of:

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
MICR*2420	[0.50]	Introduction to Microbiology

One of:

ENGG*2100	[0.75]	Engineering and Design II
STAT*2120	[0.50]	Probability and Statistics for Engineers

One of:

ENGG*2120	[0.50]	Material Science
ENGG*2230	[0.50]	Fluid Mechanics

**Note:** ENGG\*2100 or STAT\*2120 must be taken in semester 3; the remaining course must be taken in semester 4.

**Note:** ENGG\*2120 or ENGG\*2230 must be taken in semester 3; the remaining course must be taken in semester 4.

### Semester 4 - Regular or Co-op

ENGG*2450	[0.50]	Electric Circuits
ENGG*2550	[0.50]	Water Management
ENGG*2560	[0.50]	Environmental Engineering Systems
MATH*2130	[0.50]	Numerical Methods

One of:

ENGG*2100	[0.75]	Engineering and Design II
STAT*2120	[0.50]	Probability and Statistics for Engineers

One of:

ENGG*2120	[0.50]	Material Science
ENGG*2230	[0.50]	Fluid Mechanics

### Semester 5 - Regular or Co-op

ENGG*3240	[0.50]	Engineering Economics
ENGG*3260	[0.50]	Thermodynamics
ENGG*3590	[0.50]	Water Quality
ENGG*3650	[0.50]	Hydrology
ENGG*3670	[0.50]	Soil Mechanics

0.50 restricted electives

### Semester 6 - Regular / Semester 7 - Co-op

ENGG*3100	[0.75]	Engineering and Design III
ENGG*3220	[0.50]	Groundwater Engineering
ENGG*3430	[0.50]	Heat and Mass Transfer

1.50 restricted electives

### Semester 7 - Regular / Semester 6 - Co-op

ENGG*3340	[0.50]	Geographic Information Systems in Environmental Engineering
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ENGG*4000	[0.00]	Proposal for Engineering Design IV
ENGG*4360	[0.75]	Soil-Water Conservation Systems Design
ENGG*4370	[0.75]	Urban Water Systems Design

1.00 restricted electives

**Note:** WRE:C students must register for ENGG\*4000 in the final co-op work term semester immediately preceding registration in ENGG\*4150.

### Semester 8 (Winter) Regular or Co-op

ENGG*4150	[1.00]	Water Resources Engineering Design IV
ENGG*4250	[0.75]	Watershed Systems Design

1.00 restricted electives

**Note:** ENGG\*4250 can be taken in Semester 6

### Restricted Electives (see Program Guide for more information)

A maximum of 1.50 credits at the 1000 level is allowed for elective requirements.

- 2.00 credits in Complementary Studies (Students need to take 0.50 credits from each of the three sub-lists noted in the Program Guide. The remaining 0.50 credits can be taken from any Complementary Studies sub-list.)
- 1.00 credits in Water Resources Engineering electives
- 0.50 credits in Environmental Resources electives
- 0.50 credits in Water Resources electives

## Bachelor of Landscape Architecture (B.L.A.)

Landscape Architecture is the art and science of designing and conserving land and water for human use and enjoyment. As a profession, Landscape Architecture is concerned with two scales of planning and design.

The first scale is with the development of specific sites for residential, recreational, institutional, commercial and industrial projects. The second scale pertains to the regional landscape where the issues include management plans for forest, park and recreation areas, agricultural lands protection, gravel pit mining and restoration, hazard land studies, and visual resource analysis.

### Program Information

#### Objectives of the Program

Landscape Architecture is a diverse and rewarding design profession. Landscape architects play an important role in shaping our environment, working in collaboration with other design professionals, specialists and the public.

Students in the B.L.A. program attain professional knowledge and skill that prepares them to deal with problems that concern the interface between people and the environment. Program emphasis is on core professional knowledge domains that include landscape analysis, design, implementation, communication, history and professional practice. Additional required and elective courses in the arts and sciences provide a well-rounded education.

Graduates of the program have exciting careers in the public and private sector. As landscape architects, they design memorable places that are attractive, functional and sustainable and that affect the way our cities, suburbs, rural and wilderness areas are planned, designed and managed.

#### Accreditation

The Bachelor of Landscape Architecture program is accredited by the Landscape Architecture Accreditation Council (LAAC) of the Canadian Society of Landscape Architects (CSLA). This accreditation is also recognized by the American Society of Landscape Architects (ASLA). Graduates of accredited landscape architecture programs have the educational qualifications to apply for membership in provincial and state professional associates in Canada and the United States after completion of the required number of years of professional practice and successful completion of required examinations.

#### Admission to the Landscape Architecture Program

Students wishing to enter the program of study leading to the Bachelor of Landscape Architecture degree should consult Section IV--Admission Information.

#### Degree

The degree granted for the successful completion of the program is the Bachelor of Landscape Architecture (B.L.A.).

#### Selection of Electives

All electives may be chosen independently although counselling with the BLA Program Counsellor is highly recommended. In selecting electives two approaches may be followed: 1) electives may be chosen from a variety of disciplines to achieve breadth of knowledge or, 2) all or most electives may be chosen in a subject area in order to pursue a particular field of interest in depth. Some of these fields might include agricultural and biological sciences, environmental studies, studio arts, geography, philosophy or sociology.

Students wishing to elect a permissible substitute shall do so in consultation with the BLA Program Coordinator and BLA Program Counsellor. A substitute course will normally be in the same academic area as that listed in the Landscape Architecture Program.

#### Academic Advising

Students can consult the BLA Coordinator who is a faculty member that can address program issues and individual curriculum queries.

#### Computers

Expertise in many aspects of computer application is now a fundamental skill for the profession. Recognizing this, the school provides computer facilities in the building. If it is feasible we recommend that students acquire their own computer within the first two years of the program.

#### Field Trips

Participation in organized visits to site study areas and project sites is obligatory for all students taking certain courses in landscape architecture. To the extent that it is possible, students will be informed of the dates, destinations and cost of field trips prior to registration. Students who have reason to seek exemption from the requirement may apply to the director prior to registration for permission to substitute papers on appropriate topics.

#### Pre-Professional Experience

It is considered highly advisable that the prospective graduate prepare for later professional practice through summer employment in the landscape industry. Two summers spent in landscape related work followed by 1 summer in a professional office is considered to be a desirable sequence of employment.

### Continuation of Study

Students are advised to consult the regulations for continuation of study within the program which are outlined in detail in Section VIII--Undergraduate Degree Regulations & Procedures.

### Conditions for Graduation

In order to qualify for graduation from the 8 semester Honours B.L.A. program, the student must successfully complete all of the courses approved for the program (20.00 credits) and maintain a minimum 60.0% cumulative average.

### Schedule of Studies

#### Major (Honours Program)

##### Semester 1

BIOL*1500	[0.50]	Humans in the Natural World
LARC*1100	[0.75]	Design and Communications Studio
LARC*1950	[0.50]	History of Cultural Form I

One of:

ANTH*1150	[0.50]	Introduction to Anthropology
PHIL*1010	[0.50]	Introductory Philosophy: Social and Political Issues
PSYC*1000	[0.50]	Introduction to Psychology
SOC*1100	[0.50]	Sociology

0.50 electives

##### Semester 2

LARC*2020	[0.75]	Design Studio
LARC*2230	[0.50]	Planting Design
LARC*2420	[0.50]	Materials and Techniques
PHIL*2070	[0.50]	Philosophy of the Environment

0.50 electives

##### Semester 3

LARC*2100	[0.50]	Landscape Analysis
LARC*2240	[0.50]	Plants in the Landscape
LARC*2410	[0.50]	Site Engineering
LARC*3040	[0.75]	Site Planning and Design Studio

0.50 electives

##### Semester 4

LARC*2820	[0.50]	Urban and Regional Planning
LARC*3050	[0.75]	Landscape Architecture I
LARC*3430	[0.50]	Landscape Construction I

0.50 Social Science elective

\*Note: A "Social Science" elective can be any course in the following areas:

Anthropology, Economics, Geography, Women's Studies, International Development, Political Science, Psychology or Sociology.

##### Semester 5

LARC*3060	[0.75]	Landscape Architecture II
LARC*3440	[0.75]	Landscape Construction II
LARC*4610	[0.50]	Professional Practice

0.50 electives

##### Semester 6

Choose one of the following three options:

##### Option 1

2.00 electives

##### Option 2

LARC*4620	[1.00]	Internship in Landscape Architecture
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1.00 electives

##### Option 3

Exchange Program (2.00 credits)

##### Semester 7

LARC*3070	[1.00]	Landscape Architecture III
LARC*3320	[0.50]	Principles of Landscape Ecology
LARC*4510	[0.50]	Honours Thesis

0.50 electives

##### Semester 8

LARC*4090	[0.50]	Seminar
LARC*4710	[1.00]	Integrative Design Studio

0.50 electives

0.50 electives

## Bachelor of Science (B.Sc.)

The University of Guelph offers general and honours programs leading to the B.Sc. degree. The general program consists of a minimum of 15.00 credits (usually 30 semester courses) involving normally 6 semesters of study. The requirements for the honours program is a minimum of 20.00 credits (usually 40 semester courses) which may be obtained over 8 semesters of study. Some majors may require more than 20.00 credits.

### The Three Semester System

Most of the B.Sc. programs operate on the three semester system. In this system each of the Fall, Winter and Summer semesters is of 12 weeks duration. Two semesters are equivalent to 1 academic year at a university on the traditional system. In the three semester system, students may vary their rate of progress towards graduation. However, since many science courses must be taken in a certain sequence and not all courses are offered each semester, most science students are required to proceed from semester to semester in restricted patterns. Furthermore, the advanced courses of the honours programs are offered only in the regular fall and winter semesters.

Additional information may be obtained from Admissions Services, Office of Registrarial Services. The three-semester system and the pass-by-course method of advancement allow considerable flexibility of program arrangement. In addition, a variety of program contents is available which the student may modify to meet individual requirements.

### Transfer from One B.Sc. Program to Another

On entrance to the B.Sc. program, the student may elect to follow an intended area of specialization or to postpone this decision until a later semester. The choice of a particular program of study may be most effectively made at the end of Semester 3 or 4. Judicious selection of courses in each and every semester will allow the easiest transfer between programs without incurring the need for additional semesters of study. The program counsellor of the particular college from which it is anticipated that the majority of science courses will be taken should be consulted for advice.

## Program Information

### General Program Requirements

The general B.Sc. degree requires the successful completion of 15.00 credits. Normally 2.50 credits (usually 5 courses) are taken in each semester so that the degree may be completed in 6 semesters. The general science program is designed to give a broad general training in biological science, chemistry, physics and mathematical science. This is achieved by requiring each student to take a minimum of 1.00 credits in each of the above areas and an additional 0.50 credits in three of the four above areas. The courses to be taken in semesters 4 to 6 may be selected to allow a broad study of the sciences from the list of approved electives for B.Sc. students.

### Honours Program Requirements

In order to graduate from the honours program, students must fulfill all program requirements for the program and have achieved a 60%, or higher, cumulative average over all course attempts. Normally 2.50 credits (usually 5 courses) are taken in each semester so that the degree may be completed in generally 8 semesters. The following types of honours programs are offered:

#### Honours Major Programs

Major in a subject

Major in a subject with a minor or a second major

#### Honours Major

Majors permit a student to study science in greater depth than is permitted by the general program. The student is required to take a minimum of 1.00 credits (usually 2 courses) in each of biological science, chemistry, physics and mathematical science. In each of semesters 3 to 8, students select science credits so that the total program provides a broad science training with concentration in an area of physical science or biological science.

A major normally consists of certain prescribed courses (minimum of 8.00 credits) and a number of elective courses to complete the requirements for the degree. The composition of science courses selected must contain a sufficient number (minimum of 6.00 credits) of 3000 and 4000 level courses including a grouping (minimum of 2.00 credits) particularly at the 4000 level. A major program may be studied in conjunction with a minor in an area of science, humanities or social science.

#### Honours Minor

A minor is a group of courses which provides for exposure to and mastery of the fundamental principles of a subject. A minor consists of a minimum of 5.00 credits (normally 10 courses). It may also require certain other courses from other areas to be taken along with the specified courses of the minor. A minor is taken in conjunction with a major.

Students should seek advice from the program counsellor of either the [College of Biological Science](#) or the [College of Physical and Engineering Science](#) dependent upon their primary area(s) of interest. Refer to B.Sc. Program Requirements: Regulation 6 Double-Counting of Credits.

## B.Sc. Program Requirements

**Regulations 1, 2, 3 and 4 apply to all B.Sc. students.**

### 1. Entry Credits

In general, the 4U /grade 12 credit or its equivalent is required in a subject area to allow entrance to the initial university course. Students who lack this requirement can remedy the deficiency by successful completion of:

BIOL\*1020 for students lacking biology

CHEM\*1060 for students lacking chemistry

If more than one of the above courses is taken, students are required to complete additional credits beyond the minimum total required for the degree.

### 2. 1st Year Science Core

In each of the first 2 semesters B.Sc. students must take one (1) of the specified courses in each of biology, chemistry, physics and mathematical science, and 1 other course which is normally an Arts or Social Science elective.

### 3. 1000 Level Credits

If more than 7.00 credits at the 1000 level are completed, students are required to complete additional credits beyond the minimum total required for the degree.

### 4. 3000 and 4000 Level Credits

There is a requirement for a minimum of 6.00 science credits at the 3000- and 4000-levels with a minimum of 2.00 credits at the 4000 level.

### 5. Science Credits

A minimum of 16.00 science credits (usually 32 courses) is required for the honours major program. The inclusion of a minor in a non-science area involves the reduction to 14.00 science credits (usually 28 courses) with the approval of the program counsellors. Acceptable science courses in the following programs means "acceptable to the B.Sc. Program Committee". Lists of acceptable courses are available in the offices of the faculty advisors and the program counsellors and on the world wide web at the following address: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml](http://www.bsc.uoguelph.ca/Approved_electives.shtml).

### 6. Double-Counting of Credits

A maximum of 2.50 credits required in a major program may be applied to meet the requirements of a minor or an additional major.

For a completed minor in a non B.Sc. area, students can apply up to 1.00 credits, from their minor, at the 3000/4000 level towards the 6.00 credits at the 3000/4000 level required for the degree.

### 7. Continuation of Study

Students are advised to consult the regulations for continuation of study outlined in detail in Section VIII--Undergraduate Degree Regulations & Procedures.

### Doctor of Veterinary Medicine.

Students in the B.Sc. program who intend to apply for admission to the Doctor of Veterinary Medicine program should register for the Major Biological Science or Major Physical Science program, or the major of their choice. Prospective candidates for the D.V.M. program should consult the admission requirements for the program. Students may obtain assistance in selecting a program that will meet the requirements for the Doctor of Veterinary Program and for continuation in biological or physical science programs by consulting the appropriate Program Counsellor.

## General Program (BSCG)

### Continuation of Study

Students are advised to consult the regulations for continuation of study within the program which are outlined in detail in Section VIII--Undergraduate Degree Regulations & Procedures.

### Conditions for Graduation

In order to qualify for graduation from the general program the student is required to attain a passing grade in a minimum of 15.00 required credits as outlined in the Total Course Requirements for all students in the General Science Program and have achieved a minimum cumulative average of 50%.

### Total Course Requirements for all Students in the General Science Program

Total of 15.00 credits as follows:

- 4.00 credits from the first year science core - 1.00 credits beyond the 4U/ grade 12 level in each of biological science, chemistry, mathematical science, physics. Note: A maximum of 7.00 credits at the 1000 level may be used towards the degree requirements.
- An additional 0.50 credits from at least 3 of the following subject areas: biological science, biochemistry/chemistry, mathematical science, physics.
- 6.50 additional credits selected from the list of approved sciences electives for the B.Sc. degree program of which 2.50 credits must be at the 3000 or 4000 level. Note: One of: BIOL\*1020, CHEM\*1060 may be counted towards the degree requirements, counting as 0.50 credits in science.

4. 2.00 credits - arts and/or social science electives approved for the B.Sc. degree program.

5. 1.00 credits in electives.

### Recommended Schedule for Students in Biological Science Areas

#### Semester 1

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology *
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

#### Semester 2

BIOL*1070	[0.50]	Discovering Biodiversity *
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

One of:

CIS*1000	[0.50]	Introduction to Computer Applications
CIS*1200	[0.50]	Introduction to Computing
CIS*1500	[0.50]	Introduction to Programming
STAT*2040	[0.50]	Statistics I
MATH*2080	[0.50]	Elements of Calculus II

0.50 Arts or Social Science electives

\* BIOL\*1080 is a prerequisite for some courses in the biological sciences. Students are strongly recommended to also complete this course by the end of the third semester.

#### Semester 3 to 6

A minimum of 2.50 credits in each semester, including at least 2.00 acceptable science credits per semester. For details consult 'Total Course Requirements'.

### Recommended Schedule for Students in Physical Science Areas

#### Semester 1

CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I

One of

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

#### Semester 2

CHEM*1050	[0.50]	General Chemistry II
IPS*1510	[1.00]	Integrated Mathematics and Physics II

One of

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

0.50 Arts or Social Science electives

#### Semester 3 to 6

A minimum of 2.50 credits in each semester, including 2.00 acceptable science courses per semester. For details consult 'Total Course Requirements'.

### Honours Programs (BSCH)

#### Honours Program Majors

The following honours majors are available:

##### Biological Sciences:

- 20.00 credits -Animal Biology (ABIO)
- 20.00 credits -Biochemistry (BIOC)
- 20.00 credits -Biodiversity (BIOD)
- 20.00 credits -Biological Science (BIOS)
- 20.00 credits -Bio-Medical Science (BIOM)
- 20.00 credits -Biomedical Toxicology (BTOX)
- 20.00 credits -Environmental Biology (ENVB)
- 20.00 credits -Food Science (FOOD)
- 20.00 credits - Human Kinetics (HK)
- 20.00 credits - Marine and Freshwater Biology (MFB)
- 20.00 credits - Microbiology (MICR)
- 20.00 credits - Molecular Biology and Genetics (MBG)
- 20.00 credits - Neuroscience (NEUR)
- 20.00 credits - Nutritional and Nutraceutical Sciences (NANS)
- 20.00 credits - Plant Science (PLSC)
- 20.00 credits - Wildlife Biology and Conservation (WBC)
- 20.00 credits - Zoology (ZOO)

##### Physical Sciences:

- 20.00 credits - Biological and Pharmaceutical Chemistry (BPCH)
- 20.00 credits - Biological and Medical Physics (BMPH)
- 20.00 credits - Chemical Physics (CHPY)
- 20.00 credits - Chemistry (CHEM)
- 20.00 credits - Environmental Geoscience and Geomatics (EGG)
- 20.00 credits - Mathematical Science (MSCI)
- 20.00 credits - Nanoscience (NANO)
- 20.00 credits -Physical Science (PSCI)
- 20.00 credits -Physics (PHYS)
- 20.00 credits -Theoretical Physics (THPY)

##### Co-operative Educational Programs:

- 20.00 credits - Biochemistry (Co-op) (BIOC:C)
- 20.00 credits - Biological and Medical Physics (Co-op) (BMPH:C)
- 20.00 credits - Biological and Pharmaceutical Chemistry (Co-op) (BPCH:C)
- 20.00 credits -Biomedical Toxicology (Co-op) (BTOX:C)
- 20.00 credits - Chemical Physics (Co-op) (CHPY:C)
- 20.00 credits - Chemistry (Co-op) (CHEM:C)
- 20.00 credits - Food Science (Co-op) (FOOD:C)
- 20.00 credits - Nanoscience (NANO:C)
- 20.00 credits - Microbiology (Co-op) (MICR:C)
- 20.00 credits - Physics (Co-op) (PHYS:C)

##### Honours Program Minors

Minors are available in the following science areas with the particular credit requirements being given (additional minors are available from the [College of Arts](#) and the [College of Social and Applied Human Sciences](#)). A minor may include additional prerequisites - consult with the appropriate faculty advisor.

##### Biological Sciences:

- 5.00 credits - Biology (BIOL)
- 5.00 credits - Biochemistry (BIOC)
- 5.00 credits - Biotechnology (BIOT)
- 5.00 credits - Microbiology (MICR)
- 5.00 credits - Molecular Biology and Genetics (MBG)
- 5.00 credits - Neuroscience (NEUR)
- 5.00 credits - Nutritional and Nutraceutical Sciences (NANS)
- 5.00 credits - Plant Science (PLSC)
- 5.00 credits - Zoology (ZOO)

##### Physical Sciences:

- 5.00 credits - Chemistry (CHEM)
- 5.00 credits - Physics (PHYS)

##### Environmental Sciences:

- 5.00 credits - Ecology (ECOL)
- 5.00 credits - Geographic Information Systems (GIS) and Environmental Analysis

##### Mathematical Sciences:

- 5.00 credits - Computing and Information Science (CIS)
- 5.00 credits - Mathematical Science (MSCI)
- 5.00 credits - Mathematics (MATH)
- 5.00 credits - Statistics (STAT)

##### Additional Disciplines:

- 5.00 credits - Business Economics (BECN)

##### Continuation of Study

Students are advised to consult the regulations for continuation of study within the program which are outlined in detail in Section VII--Undergraduate Degree Regulations & Procedures.

##### Conditions for Graduation

###### Schedules 1 and 2

In order to qualify for graduation from the honours program, the student must fulfill all program requirements and have achieved 60%, or higher, cumulative average in all course attempts.

**Note:** A student registered in an honours program who has successfully completed all required courses and the specified total number of credits for the program but does not have a cumulative average of 60%, or higher, may apply to graduate from the general program.

##### Co-operative Education Program

Admission to the Co-operative Education program may be granted on entry to the University or by application normally before the conclusion of Semester 1. Application forms can be obtained from the Coop Education and Career Services website <https://www.recruitguelph.ca/cecs/>.

**Conditions for Graduation from the B.Sc. Co-operative Education Program**

Conditions for graduation are the same as the corresponding regular B.Sc. program. In addition, all work reports and work performance evaluations must have a grade of satisfactory or better.

**Animal Biology (ABIO)**

Department of Animal Biosciences, Ontario Agricultural College

**Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor.

**Semester 1**

BIOL*1050	[0.50]	Biology of Plants & Animals in Managed Ecosystems
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

ANSC*1210	[1.00]	Principles of Animal Care and Welfare
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

**Semester 3**

AGR*2350	[0.50]	Animal Production Systems, Health and Industry
BIOC*2580	[0.50]	Introduction to Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics

0.50 electives or restricted electives

Students are encouraged to consider CIS\*1000 as an elective if they wish to enhance their computer literacy.

**Semester 4**

ANSC*2340	[0.50]	Structure of Farm Animals
MCB*2050	[0.50]	Molecular Biology of the Cell
NUTR*3210	[0.50]	Fundamentals of Nutrition
STAT*2040	[0.50]	Statistics I

0.50 electives or restricted electives

**Semester 5**

ANSC*3080	[0.50]	Agricultural Animal Physiology
ANSC*3120	[0.50]	Introduction to Animal Nutrition

1.50 electives or restricted electives

**Semester 6**

ANSC*3040	[0.50]	Animal Reproduction
ANSC*3270	[0.50]	Animal Disorders
MBG*3060	[0.50]	Quantitative Genetics

1.00 electives or restricted electives

**Semester 7**

2.50 electives or restricted electives

**Semester 8**

2.50 electives or restricted electives

**Restricted Electives**

- Students must complete 2.00 credits from Arts or Social Science courses. ANSC\*1210 is an Arts and Social Science 1.00 credit. 1.00 additional credits from Arts or Social Science are required.
- 0.50 credits is required from each of the following areas: Animal Nutrition, Animal Breeding & Genetics, and Animal Physiology & Behaviour. Students are encouraged to consult with the Faculty Advisor for help in tailoring their selection to meet personal and career interests.

Animal Breeding & Genetics [0.50] Required

ANSC*4050	[0.50]	Biotechnology in Animal Science
MBG*4020	[0.50]	Genetics of Companion Animals
MBG*4030	[0.50]	Animal Breeding Methods and Applications

Animal Nutrition [0.50] Required

ANSC*3170	[0.50]	Nutrition of Fish and Crustacea
ANSC*3180	[0.50]	Wildlife Nutrition
ANSC*4260	[0.50]	Beef Cattle Nutrition
ANSC*4270	[0.50]	Dairy Cattle Nutrition
ANSC*4280	[0.50]	Poultry Nutrition
ANSC*4290	[0.50]	Swine Nutrition
ANSC*4560	[0.50]	Pet Nutrition
EQN*4020	[0.50]	Advanced Equine Nutrition

Animal Physiology & Behaviour [0.50] Required

ANSC*4090	[0.50]	Applied Animal Behaviour
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ANSC*4100	[0.50]	Applied Environmental Physiology and Animal Housing
ANSC*4350	[0.50]	Experiments in Animal Biology
ANSC*4470	[0.50]	Animal Metabolism
ANSC*4490	[0.50]	Applied Endocrinology

3. An additional 3.00 credits must be obtained by selecting courses from the above lists and from the following:

ANSC*3050	[0.50]	Aquaculture: Advanced Issues
ANSC*4610	[0.50]	Critical Analysis in Animal Science
ANSC*4650	[0.50]	Comparative Immunology
ANSC*4700	[0.50]	Research in Animal Biology I
ANSC*4710	[0.50]	Research in Animal Biology II
BIOC*3560	[0.50]	Structure and Function in Biochemistry
EQN*3050	[0.50]	Equine Exercise Physiology
MICR*3230	[0.50]	Immunology
PATH*3610	[0.50]	Principles of Disease
POPM*3240	[0.50]	Epidemiology
POPM*4230	[0.50]	Animal Health

**Credit Summary (20.00 Total Credits)**

3.50 - First year science credits

6.50 - Required science courses semesters 3 - 8

4.50 - Restricted electives (#2 and #3)

1.50 - Approved Science electives

1.00 - Required Arts and/or Social Science course (ANSC 1210)

1.00 - Approved Arts and/or Social Science electives

2.00 - Free electives - any approved elective for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Biochemistry (BIOC)**

Department of Molecular and Cellular Biology, College of Biological Science

A B.Sc. in Biochemistry offers a multidisciplinary curriculum that gives students broad exposure to the life sciences with specific attention paid to the physical and chemical nature of biomolecular systems. The lab-intensive experience in this program prepares students to pursue post-graduate research opportunities in many different life science related fields. Graduates are also positioned to be successful in obtaining entrance to a number of professional programs, as well as employment in industry and government.

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. The major will require the completion of at least 20.00 credits as indicated below:

**Major (Honours Program)****Semester 1**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
MATH*2080	[0.50]	Elements of Calculus II
PHYS*1070	[0.50]	Physics for Life Sciences II

**Semester 3**

BIOC*2580	[0.50]	Introduction to Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MICR*2420	[0.50]	Introduction to Microbiology
STAT*2040	[0.50]	Statistics I

0.50 Arts or Social Science electives

**Semester 4**

BIOC*3560	[0.50]	Structure and Function in Biochemistry
CHEM*2480	[0.50]	Analytical Chemistry I
CHEM*2700	[0.50]	Organic Chemistry I
MCB*2050	[0.50]	Molecular Biology of the Cell
MICR*2430	[0.50]	Methods in Microbial Culture and Physiology

**Semester 5**

BIOC*3570	[0.75]	Analytical Biochemistry
CHEM*2880	[0.50]	Physical Chemistry
CHEM*3750	[0.50]	Organic Chemistry II

electives or restricted electives to a maximum of 2.75 total credits



**Semester 6**

MBG\*3350 [0.75] Laboratory Methods in Molecular Biology I  
electives or restricted electives to a maximum of 2.75 total credits

**Semester 7**

2.50 electives or restricted electives

**Semester 8**

BIOC\*4540 [0.75] Enzymology  
electives or restricted electives to a maximum of 2.75 total credits

**Restricted Electives**

1. Students must take as part of their program: 4.00 credits from the following list, with at least 1.00 of these credits from BIOC\*4520, BIOC\*4580, MCB\*4050.

BIOC*4520	[0.50]	Metabolic Processes
BIOC*4580	[0.50]	Membrane Biochemistry
BIOL*3300	[0.50]	Applied Bioinformatics
BIOM*3200	[1.00]	Biomedical Physiology
MBG*3040	[0.50]	Molecular Biology of the Gene
MBG*3080	[0.50]	Bacterial Genetics
MCB*3010	[0.50]	Dynamics of Cell Function and Signaling
MCB*4010	[0.50]	Advanced Cell Biology
MCB*4050	[0.50]	Protein and Nucleic Acid Structure
MCB*4500	[1.00]	Research Project in Molecular & Cellular Biology I

MCB*4510	[1.00]	Research Project in Molecular & Cellular Biology
MCB*4600	[0.50]	Topics in Molecular and Cellular Biology
MICR*3230	[0.50]	Immunology
MICR*3330	[0.50]	World of Viruses
MICR*4330	[0.50]	Molecular Virology
MICR*4530	[0.50]	Immunology II
PBIO*3110	[0.50]	Crop Physiology
PBIO*4750	[0.50]	Genetic Engineering of Plants
STAT*2050	[0.50]	Statistics II
TOX*4590	[0.50]	Biochemical Toxicology

2. Students must take as part of their program: 0.50 credits from the following list:

PHYS*2030	[0.50]	Biophysics of Excitable Cells
PHYS*2240	[0.50]	Thermal Physics
PHYS*2330	[0.50]	Electricity and Magnetism I
PHYS*2600	[0.50]	General Astronomy
PHYS*3080	[0.50]	Energy

**Credit Summary (20.00 Total Credits)**

4.50 - First year science credits

7.75 - Required science courses semesters 3 - 8

4.50 - Restricted elective (# 1 and # 2 in restricted elective list)

1.00 - Approved Arts and/or Social Science electives

2.25 - Free electives – any approved electives for B.Sc. students

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Minor (Honours Program)**

A minor in Biochemistry consists of at least 5.00 course credits. The following courses are required:

BIOC*3560	[0.50]	Structure and Function in Biochemistry
BIOC*3570	[0.75]	Analytical Biochemistry
BIOC*4540	[0.75]	Enzymology
CHEM*2480	[0.50]	Analytical Chemistry I
CHEM*2700	[0.50]	Organic Chemistry I

One of:

MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MICR*2420	[0.50]	Introduction to Microbiology

In addition, at least 1.50 credits must be chosen from the following courses, with at least 1.00 credits from the first three courses listed:

BIOC*4520	[0.50]	Metabolic Processes
BIOC*4580	[0.50]	Membrane Biochemistry
MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I
MCB*4050	[0.50]	Protein and Nucleic Acid Structure
MICR*3230	[0.50]	Immunology
MICR*3330	[0.50]	World of Viruses
TOX*4590	[0.50]	Biochemical Toxicology

**Biochemistry (Co-op) (BIOC:C)**

Department of Molecular and Cellular Biology, College of Biological Science

A B.Sc. in Biochemistry offers a multidisciplinary curriculum that gives students broad exposure to the life sciences with specific attention paid to the physical and chemical nature of biomolecular systems. The lab-intensive experience in this program prepares students to pursue post-graduate research opportunities in many different life science related fields. Graduates are also positioned to be successful in obtaining entrance to a number of professional programs, as well as employment in industry and government.

Two Streams are available. Stream A is different from Stream B in that Stream A has a double work term following academic semester 5. The course content of semesters 1-4 is the same as that listed above for the regular Honours Program Major. Students in the Co-op program must also take COOP\*1100 in the second academic semester. The total program requirements, including the selection of electives are also the same.

Students will be expected to undertake their work terms after semester 3 and completion of course CHEM\*2480. Since certain courses must be taken in a different semester from usual, consult your Faculty Co-op Advisor for assistance with course selection.

To graduate from the Co-op program, a minimum of 4 successfully completed work terms is normally required.

This major requires the completion of 20.00 credits as indicated below.

**Stream A****Semester 1 - Fall**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2 - Winter**

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
COOP*1100	[0.00]	Introduction to Co-operative Education
MATH*2080	[0.50]	Elements of Calculus II
PHYS*1070	[0.50]	Physics for Life Sciences II

**Summer Semester**

No academic semester or work term

**Semester 3 - Fall**

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*2480	[0.50]	Analytical Chemistry I
CHEM*2880	[0.50]	Physical Chemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics

0.50 Arts or Social Science electives

**Winter Semester**

COOP*1000	[0.00]	Co-op Work Term I
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**Semester 4 - Summer**

BIOL*3570	[0.75]	Analytical Biochemistry
CHEM*2700	[0.50]	Organic Chemistry I
MICR*2420	[0.50]	Introduction to Microbiology
STAT*2040	[0.50]	Statistics I

electives or restricted electives to a maximum of 2.75 total credits

**Semester 5 - Fall**

BIOC*3560	[0.50]	Structure and Function in Biochemistry
CHEM*3750	[0.50]	Organic Chemistry II
MCB*2050	[0.50]	Molecular Biology of the Cell
MICR*2430	[0.50]	Methods in Microbial Culture and Physiology

0.50 electives or restricted electives

**Winter Semester**

COOP*2000	[0.00]	Co-op Work Term II
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**Summer Semester**

COOP*3000	[0.00]	Co-op Work Term III
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**Semester 6 - Fall**

MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I
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electives or restricted electives to a maximum of 2.75 total credits

**Semester 7 - Winter**

BIOC*4540	[0.75]	Enzymology
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electives or restricted electives to a maximum of 2.75 total credits

**Summer Semester**

COOP*4000	[0.00]	Co-op Work Term IV
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**Semester 8 - Fall**

2.50 electives or restricted electives

**Restricted Electives**

1. Students must take as part of their program: 4.00 credits from the following list, with at least 1.00 of these credits from BIOC\*4520, BIOC\*4580, MCB\*4050.

BIOC*4520	[0.50]	Metabolic Processes
BIOC*4580	[0.50]	Membrane Biochemistry
BIOL*3300	[0.50]	Applied Bioinformatics
BIOM*3200	[1.00]	Biomedical Physiology
MBG*3040	[0.50]	Molecular Biology of the Gene
MBG*3080	[0.50]	Bacterial Genetics
MCB*3010	[0.50]	Dynamics of Cell Function and Signaling
MCB*4010	[0.50]	Advanced Cell Biology
MCB*4050	[0.50]	Protein and Nucleic Acid Structure
MCB*4500	[1.00]	Research Project in Molecular & Cellular Biology I
MCB*4510	[1.00]	Research Project in Molecular & Cellular Biology
MCB*4600	[0.50]	Topics in Molecular and Cellular Biology
MICR*3230	[0.50]	Immunology
MICR*3330	[0.50]	World of Viruses
MICR*4330	[0.50]	Molecular Virology
MICR*4530	[0.50]	Immunology II
PBIO*3110	[0.50]	Crop Physiology
PBIO*4750	[0.50]	Genetic Engineering of Plants
STAT*2050	[0.50]	Statistics II
TOX*4590	[0.50]	Biochemical Toxicology

2. Students must take as part of their program: 0.50 credits from the following list:

PHYS*2030	[0.50]	Biophysics of Excitable Cells
PHYS*2240	[0.50]	Thermal Physics
PHYS*2330	[0.50]	Electricity and Magnetism I
PHYS*2600	[0.50]	General Astronomy
PHYS*3080	[0.50]	Energy

**Stream B****Semester 1 - Fall**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2 - Winter**

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
COOP*1100	[0.00]	Introduction to Co-operative Education
MATH*2080	[0.50]	Elements of Calculus II
PHYS*1070	[0.50]	Physics for Life Sciences II

**Summer Semester**

No academic semester or work term

**Semester 3 - Fall**

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*2480	[0.50]	Analytical Chemistry I
CHEM*2880	[0.50]	Physical Chemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics

0.50 Arts or Social Science electives

**Winter Semester**

COOP*1000	[0.00]	Co-op Work Term I
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**Semester 4 - Summer**

BIOC*3570	[0.75]	Analytical Biochemistry
CHEM*2700	[0.50]	Organic Chemistry I
MICR*2420	[0.50]	Introduction to Microbiology
STAT*2040	[0.50]	Statistics I

electives or restricted electives to a maximum of 2.75 total credits

**Fall Semester**

COOP*2000	[0.00]	Co-op Work Term II
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**Semester 5 - Winter**

BIOC*3560	[0.50]	Structure and Function in Biochemistry
MCB*2050	[0.50]	Molecular Biology of the Cell
MICR*2430	[0.50]	Methods in Microbial Culture and Physiology

1.00 electives or restricted electives

**Summer Semester**

COOP*3000	[0.00]	Co-op Work Term III
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**Semester 6 - Fall**

CHEM*3750	[0.50]	Organic Chemistry II
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2.00 electives or restricted electives

**Semester 7 - Winter**

BIOC*4540	[0.75]	Enzymology
MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I

1.00 electives or restricted electives

**Summer Semester**

COOP*4000	[0.00]	Co-op Work Term IV
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**Semester 8 - Fall**

2.50 electives or restricted electives

**Restricted Electives**

1. Students must take as part of their program: 4.00 credits from the following list, with at least 1.00 of these credits from BIOC\*4520, BIOC\*4580, MCB\*4050.

BIOC*4520	[0.50]	Metabolic Processes
BIOC*4580	[0.50]	Membrane Biochemistry
BIOL*3300	[0.50]	Applied Bioinformatics
BIOM*3200	[1.00]	Biomedical Physiology
MBG*3040	[0.50]	Molecular Biology of the Gene
MBG*3080	[0.50]	Bacterial Genetics
MCB*3010	[0.50]	Dynamics of Cell Function and Signaling
MCB*4010	[0.50]	Advanced Cell Biology
MCB*4050	[0.50]	Protein and Nucleic Acid Structure
MCB*4500	[1.00]	Research Project in Molecular & Cellular Biology I
MCB*4510	[1.00]	Research Project in Molecular & Cellular Biology
MCB*4600	[0.50]	Topics in Molecular and Cellular Biology
MICR*3230	[0.50]	Immunology
MICR*3330	[0.50]	World of Viruses
MICR*4330	[0.50]	Molecular Virology
MICR*4530	[0.50]	Immunology II
PBIO*3110	[0.50]	Crop Physiology
PBIO*4750	[0.50]	Genetic Engineering of Plants
STAT*2050	[0.50]	Statistics II
TOX*4590	[0.50]	Biochemical Toxicology

2. Students must take as part of their program: 0.50 credits from the following list:

PHYS*2030	[0.50]	Biophysics of Excitable Cells
PHYS*2240	[0.50]	Thermal Physics
PHYS*2330	[0.50]	Electricity and Magnetism I
PHYS*2600	[0.50]	General Astronomy
PHYS*3080	[0.50]	Energy

**Credit Summary (20.00 Total Credits)**

4.50 - First year science credits

7.75 - Required science courses semesters 3 - 8

4.50 - Restricted elective (# 1 and #2 in restricted elective list)

1.00 - Approved Arts and/or Social Science electives

2.25 - Free electives – any approved electives for B.Sc. students

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Biodiversity (BIOD)****Department of Integrative Biology, College of Biological Science**

The Major in Biodiversity offers a broad education in the diversity and evolution of life while providing a more specialized understanding of biology at the level of the organism. It is the most flexible of the majors offered by the Department of Integrative Biology and as such, it allows students the opportunity to design a customized program around their interests. The major qualifies students for postgraduate work in biodiversity, botany, zoology, and other life sciences and provides a sound science background for students wishing to pursue professional life science degrees or careers in teaching, government service or the private sector.

**Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. A minimum total of 20.00 credits are required to complete the major.

**Semester 1**

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

BIOL*1080	[0.50]	Biological Concepts of Health
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BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

0.50 electives or restricted electives\*

### Semester 3

BIOC*2580	[0.50]	Introduction to Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
ZOO*2090	[0.50]	Vertebrate Structure and Function

1.00 electives or restricted electives\*

### Semester 4

BIOL*2060	[0.50]	Ecology
BIOL*2400	[0.50]	Evolution
STAT*2230	[0.50]	Biostatistics for Integrative Biology
ZOO*2700	[0.50]	Invertebrate Morphology & Evolution

0.50 electives or restricted electives\*

### Semester 5

MICR*2420	[0.50]	Introduction to Microbiology
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2.00 electives or restricted electives\*

### Semester 6

BOT*3710	[0.50]	Plant Diversity and Evolution
ENVS*3090	[0.50]	Insect Diversity and Biology
IBIO*3100	[0.50]	Interpreting Biodiversity I

1.00 electives or restricted electives\*

### Semester 7

IBIO*4100	[1.00]	Interpreting Biodiversity II
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1.50 electives or restricted electives\*

### Semester 8

2.50 electives or restricted electives\*

#### \* Restricted Electives

\*The major in Biodiversity is a flexible program that allows students, in consultation with faculty advisors, to pursue their own interests and design a customized program of study. For example, students may wish to select their electives to focus on a particular taxonomic group such as microbes, plants, invertebrates, or vertebrates, and/or one of the three areas of research strength in the Department of Integrative Biology: physiology, ecology, or evolution.

- At least 1.00 Arts and/or Social Science electives are required. The list of approved Arts and Social Science electives for B.Sc. students is available at: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml#arts](http://www.bsc.uoguelph.ca/Approved_electives.shtml#arts)
- A minimum of 0.50 credits from:
 

BOT*2100	[0.50]	Life Strategies of Plants
BOT*3050	[0.50]	Plant Functional Ecology
ZOO*3600	[0.50]	Comparative Animal Physiology I
- A minimum of 0.50 credits from:
 

BOT*3310	[0.50]	Plant Growth and Development
BOT*3410	[0.50]	Plant Anatomy
ZOO*3050	[0.50]	Developmental Biology
- A minimum of 0.50 credits from the following list. Biodiversity students are strongly encouraged to take at least one field course. Students should keep in mind that some of these courses have prerequisites that are not required courses for the BIOD major and should plan their programs accordingly.
 

BIOL*4410	[0.75]	Field Ecology
BIOL*4610	[0.75]	Arctic Ecology
BIOL*4700	[0.50]	Field Biology
BIOL*4710	[0.25]	Field Biology
BIOL*4800	[0.50]	Field Biology
BIOL*4810	[0.25]	Field Biology
IBIO*4500	[0.75]	Research in Integrative Biology I
IBIO*4510	[0.75]	Research in Integrative Biology II
IBIO*4521/2	[2.00]	Thesis in Integrative Biology
ZOO*4170	[0.50]	Experimental Comparative Animal Physiology
ZOO*4300	[0.75]	Marine Biology and Oceanography

Other field or research courses with approval of faculty advisor.

#### Credit Summary (20.00 Total Credits)

- 4.00 - First year science credits
- 6.50 - Required science courses semesters 3 - 8
- 1.50 - Restricted elective (# 2, 3 and 4 in restricted elective list)
- 4.00 - Approved Science electives
- 1.00 - Arts and/or Social Science electives (# 1 in restricted elective list)
- 3.00 - Free electives - any approved elective for B.Sc. students.

\*Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

## Biological and Medical Physics (BMPH)

Department of Physics, College of Physical and Engineering Science

### Major (Honours Program)

The program emphasizes the application of physics to biology and medicine. It provides an excellent background for careers in the expanding interdisciplinary research laboratories of government and industry, as well as a starting point for a career in medical physics. Completion of the program at an appropriate level will qualify a student to pursue post-graduate studies in biophysics, medical physics and related areas of physics.

Since some of the required courses are not offered every semester, students entering the Major in Biological and Medical Physics should plan their program in consultation with the Department of Physics Faculty Advisor.

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. This major requires the completion of 20.00 credits as follows:

#### Semester 1

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1160	[0.50]	Linear Algebra I

1.00 credits from: IPS\*1500, or (MATH\*1080, PHYS\*1080) or (MATH\*1200, PHYS\*1080)

\* IPS\*1500 is recommended

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

#### Semester 2

BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
CIS*1500	[0.50]	Introduction to Programming

1.00 credits from: IPS\*1510, or (MATH\*2080, PHYS\*1070) or (MATH\*1210, PHYS\*1010)

\* IPS\*1510 is recommended

#### Semester 3

MATH*2200	[0.50]	Advanced Calculus I
MATH*2270	[0.50]	Applied Differential Equations
PHYS*2240	[0.50]	Thermal Physics
PHYS*2330	[0.50]	Electricity and Magnetism I

0.50 Arts or Social Science electives

#### Semester 4

BIOC*2580	[0.50]	Introduction to Biochemistry
PHYS*2030	[0.50]	Biophysics of Excitable Cells
PHYS*2180	[0.50]	Experimental Techniques in Physics
PHYS*2310	[0.50]	Mechanics
PHYS*2340	[0.50]	Electricity and Magnetism II

#### Semester 5

NANO*3600	[0.50]	Computational Methods in Materials Science
PHYS*3130	[0.50]	Mathematical Physics
PHYS*3230	[0.50]	Quantum Mechanics I

1.00 electives \*\*

#### Semester 6

PHYS*3510	[0.50]	Intermediate Laboratory
PHYS*4040	[0.50]	Quantum Mechanics II
PHYS*4300	[0.50]	Inquiry in Physics
PHYS*4540	[0.50]	Molecular Biophysics

0.50 electives \*\*

#### Semester 7

PHYS*3170	[0.50]	Radioactivity and Radiation Interactions
PHYS*4500	[0.50]	Advanced Physics Laboratory

One of:

PHYS*4001	[0.50]	Research in Physics
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0.50 electives \*\*

1.00 electives \*\*

#### Semester 8

PHYS*4070	[0.50]	Clinical Applications of Physics in Medicine
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One of:

PHYS*4002	[0.50]	Research in Physics
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0.50 electives \*\*

1.50 electives \*\*

Note: PHYS\*4001/2 will be projects in biological or medical physics, some of which may be in areas outside the Department of Physics.

\*\* A minimum of 1.00 credits in Arts/Social Science is required. In addition, students are required to complete 1.50 credits from either List A or List B as follows:

#### List A: Biological Physics stream

BIOC*3560	[0.50]	Structure and Function in Biochemistry
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BIOC*4580	[0.50]	Membrane Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MCB*2050	[0.50]	Molecular Biology of the Cell
MCB*4050	[0.50]	Protein and Nucleic Acid Structure
PHYS*3000	[0.50]	Optics: Fundamentals and Applications

**List B: Medical Physics stream**

BIOM*2000	[0.50]	Concepts in Human Physiology
ENGG*4040	[0.50]	Medical Imaging Modalities
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
PATH*3610	[0.50]	Principles of Disease
PHYS*3000	[0.50]	Optics: Fundamentals and Applications
PHYS*4130	[0.50]	Subatomic Physics

**Credit Summary (20.00 Total Credits)**

4.50 - First year science credits

10.00 - Required science courses semesters 3 – 8

1.50 - Restricted electives (from List A OR List B)

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Biological and Medical Physics (Co-op) (BMPH:C)****Department of Physics, College of Physical and Engineering Science****Major (Honours Program)**

The program emphasizes the application of physics to biology and medicine. It provides an excellent background for careers in the expanding interdisciplinary research laboratories of government and industry, as well as a starting point for a career in medical physics. Completion of the program at an appropriate level will qualify a student to pursue post-graduate studies in biophysics, medical physics and related areas of physics.

Since some of the required courses are not offered every semester, students entering the Major in Biological and Medical Physics (Co-op) should plan their program in consultation with the Department of Physics Faculty Advisor.

To graduate from the Co-op program a minimum of 4 successfully completed work terms is normally required. Students are eligible to participate in a maximum two (2) work terms commencing in the summer and must follow the academic work schedule as outlined in the Co-operative Education & Career Services website: <https://www.recruituelph.ca/cecs/>.

This major requires the completion of 20.00 credits as follows:

**Semester 1 - Fall**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1160	[0.50]	Linear Algebra I

1.00 credits from: IPS\*1500, or (MATH\*1080, PHYS\*1080) or (MATH\*1200, PHYS\*1080)

\* IPS\*1500 is recommended

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/reviseds>

**Semester 2 - Winter**

BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
CIS*1500	[0.50]	Introduction to Programming

1.00 credits from: IPS\*1510, or (MATH\*2080, PHYS\*1070) or (MATH\*1210, PHYS\*1010)

\* IPS\*1510 is recommended

**Semester 3 - Fall**

COOP*1100	[0.00]	Introduction to Co-operative Education
MATH*2200	[0.50]	Advanced Calculus I
MATH*2270	[0.50]	Applied Differential Equations
PHYS*2240	[0.50]	Thermal Physics
PHYS*2330	[0.50]	Electricity and Magnetism I

0.50 Arts or Social Science electives

**Semester 4 - Winter**

BIOC*2580	[0.50]	Introduction to Biochemistry
PHYS*2030	[0.50]	Biophysics of Excitable Cells
PHYS*2180	[0.50]	Experimental Techniques in Physics
PHYS*2310	[0.50]	Mechanics
PHYS*2340	[0.50]	Electricity and Magnetism II

**Summer Semester**

COOP*1000	[0.00]	Co-op Work Term I ++
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**Semester 5 - Fall**

NANO*3600	[0.50]	Computational Methods in Materials Science
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PHYS*3130	[0.50]	Mathematical Physics
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1.50 electives \*\*\*

**Winter Semester**

COOP*2000	[0.00]	Co-op Work Term II ++
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(8-month work term in conjunction with COOP\*3000)

**Summer Semester**

COOP*3000	[0.00]	Co-op Work Term III ++
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(8-month work term in conjunction with COOP\*2000)

**Semester 6 - Fall**

PHYS*3170	[0.50]	Radioactivity and Radiation Interactions
PHYS*3230	[0.50]	Quantum Mechanics I

1.50 electives \*\*\*

**Semester 7 - Winter**

PHYS*3510	[0.50]	Intermediate Laboratory
PHYS*4040	[0.50]	Quantum Mechanics II
PHYS*4300	[0.50]	Inquiry in Physics
PHYS*4540	[0.50]	Molecular Biophysics

0.50 electives \*\*\*

**Summer Semester**

COOP*4000	[0.00]	Co-op Work Term IV ++
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**Fall Semester**

COOP*5000	[0.00]	Co-op Work Term V ++
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**Semester 8 - Winter**

PHYS*4070	[0.50]	Clinical Applications of Physics in Medicine
PHYS*4500	[0.50]	Advanced Physics Laboratory

1.50 electives \*\*\*

++Four work terms are required for the completion of the co-op degree. It is also necessary that there be at least one work term in each of Fall, Winter and Summer semesters. Therefore, one of the summer work terms could be missed and the student would still graduate successfully. Whether the student completes four or five work terms, a report is required for each work term completed. Contact the co-op faculty advisor for further details.

Students are required to complete 1.50 credits from either List A or List B as follows:

**List A: Biological Physics stream**

BIOC*3560	[0.50]	Structure and Function in Biochemistry
BIOC*4580	[0.50]	Membrane Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MCB*2050	[0.50]	Molecular Biology of the Cell
MCB*4050	[0.50]	Protein and Nucleic Acid Structure
PHYS*3000	[0.50]	Optics: Fundamentals and Applications

**List B: Medical Physics stream**

BIOM*2000	[0.50]	Concepts in Human Physiology
ENGG*4040	[0.50]	Medical Imaging Modalities
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
PATH*3610	[0.50]	Principles of Disease
PHYS*3000	[0.50]	Optics: Fundamentals and Applications
PHYS*4130	[0.50]	Subatomic Physics

**Credit Summary (20.00 Total Credits)**

4.50 - First year science credits

10.00 - Required science courses semesters 3 – 8

1.50 - Restricted electives (from List A OR List B)

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Biological and Pharmaceutical Chemistry (BPCH)****Department of Chemistry, College of Physical and Engineering Science****Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. This major will require the completion of 20.00 credits as indicated below:

**Semester 1**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I

0.50 Arts or Social Science electives

Students who are lacking one 4U /grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science

courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

CHEM*1050	[0.50]	General Chemistry II
IPS*1510	[1.00]	Integrated Mathematics and Physics II

One of

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health

0.50 Arts or Social Science electives

**Semester 3**

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*2060	[0.50]	Structure and Bonding
CHEM*2880	[0.50]	Physical Chemistry

One of

MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
STAT*2040	[0.50]	Statistics I

0.50 electives or restricted electives

**Semester 4**

CHEM*2070	[0.50]	Structure and Spectroscopy
CHEM*2700	[0.50]	Organic Chemistry I
CHEM*2400	[0.75]	Analytical Chemistry I
MICR*2420	[0.50]	Introduction to Microbiology

One of

MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
STAT*2040	[0.50]	Statistics I

**Semester 5**

BIOC*3570	[0.75]	Analytical Biochemistry
CHEM*3750	[0.50]	Organic Chemistry II

One of:

CHEM*3640	[0.50]	Chemistry of the Elements I **
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0.50 electives or restricted electives \*

One of:

TOX*3300	[0.50]	Analytical Toxicology ***
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0.50 electives or restricted electives \*

Electives or restricted electives to a maximum of 2.75 total credits in this semester\*

\*\* CHEM\*3640 is a prerequisite for CHEM\*3650

\*\*\* TOX\*3300 is a substitute for CHEM\*3430 in Semester 6

**Semester 6**

Select either Option A or Option B

**Option A (at Guelph)**

BIOC*3560	[0.50]	Structure and Function in Biochemistry
CHEM*3430	[0.50]	Analytical Chemistry II: Instrumental Analysis
CHEM*3650	[0.50]	Chemistry of the Elements II
CHEM*3760	[0.50]	Organic Chemistry III

0.50 electives or restricted electives \*

**Option B (at Seneca)**

2.50 credits from:

XSEN*3030	[0.50]	Pharmacology and Applied Toxicology
XSEN*3040	[0.50]	Occupational Health and Chemistry
XSEN*3060	[0.50]	Pharmaceutical Analysis - Advanced
XSEN*3070	[0.50]	Pharmaceutical Product Formulations
XSEN*3090	[0.50]	Biopharmaceuticals
XSEN*3200	[0.50]	Pharmaceutical Organic Chemistry
XSEN*3210	[0.50]	Introduction to Pharmaceutical Manufacturing

Note: All XSEN courses are taught at the Seneca@York campus of Seneca College in Toronto. (For more information, go to: <http://www.chemistry.uoguelph.ca/bpch/>)

**Semester 7**

One of:

CHEM*4730	[0.50]	Synthetic Organic Chemistry
CHEM*4740	[0.50]	Topics in Bio-Organic Chemistry

2.00 electives or restricted electives \*

**Semester 8**

2.50 electives or restricted electives \*

**\*\* Restricted Electives**

\*\*Students are advised to pay particular attention to pre-requisite requirements when choosing individual courses, and seek advice as needed.

1. 0.50 credits from the following:

MCB*2050	[0.50]	Molecular Biology of the Cell
TOX*2000	[0.50]	Principles of Toxicology

2. A minimum of 1.50 credits at the 4000 level and 2.50 credits at the 3000/4000 level from the following list:

BIOC*3560	[0.50]	Structure and Function in Biochemistry
BIOC*4520	[0.50]	Metabolic Processes
BIOC*4540	[0.75]	Enzymology **

BIOC*4580	[0.50]	Membrane Biochemistry
BIOM*3090	[0.50]	Principles of Pharmacology **
BIOM*3200	[1.00]	Biomedical Physiology
BIOM*4090	[0.50]	Pharmacology **
CHEM*3360	[0.50]	Environmental Chemistry and Toxicology
CHEM*3440	[0.50]	Analytical Chemistry III: Analytical Instrumentation
CHEM*3640	[0.50]	Chemistry of the Elements I
CHEM*3650	[0.50]	Chemistry of the Elements II **
CHEM*3760	[0.50]	Organic Chemistry III
CHEM*4010	[0.50]	Chemistry and Industry
CHEM*4400	[0.50]	Advanced Topics in Analytical Chemistry
CHEM*4630	[0.50]	Bioinorganic Chemistry **
CHEM*4720	[0.50]	Organic Reactivity **
CHEM*4730	[0.50]	Synthetic Organic Chemistry **
CHEM*4740	[0.50]	Topics in Bio-Organic Chemistry
CHEM*4900	[1.00]	Chemistry Research Project I **
CHEM*4910	[1.00]	Chemistry Research Project II **
MBG*3040	[0.50]	Molecular Biology of the Gene **
MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I **
MCB*4050	[0.50]	Protein and Nucleic Acid Structure **
MICR*3230	[0.50]	Immunology
NUTR*3210	[0.50]	Fundamentals of Nutrition
PATH*3610	[0.50]	Principles of Disease
TOX*4590	[0.50]	Biochemical Toxicology **
XSEN*3030	[0.50]	Pharmacology and Applied Toxicology
XSEN*3040	[0.50]	Occupational Health and Chemistry
XSEN*3060	[0.50]	Pharmaceutical Analysis - Advanced
XSEN*3070	[0.50]	Pharmaceutical Product Formulations
XSEN*3090	[0.50]	Biopharmaceuticals
XSEN*3200	[0.50]	Pharmaceutical Organic Chemistry
XSEN*3210	[0.50]	Introduction to Pharmaceutical Manufacturing

**Credit Summary (20.00 Total Credits)**

4.00 - First year science credits

6.50 - Required science courses semesters 3 – 8

5.00 - Restricted electives (#1 and 2 in restricted electives list)

0.50 - Approved Science electives

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. students. (could be less if restricted electives do not count as science)

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Biological and Pharmaceutical Chemistry (Co-op) (BPCH:C)**

Department of Chemistry, College of Physical and Engineering Science

**Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. This major will require the completion of 20.00 credits as indicated below:

**Semester 1 - Fall**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I

0.50 Arts or Social Science electives

Students who are lacking one 4U /grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2 - Winter**

CHEM*1050	[0.50]	General Chemistry II
COOP*1100	[0.00]	Introduction to Co-operative Education
IPS*1510	[1.00]	Integrated Mathematics and Physics II

One of

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health

0.50 Arts or Social Science electives

**Semester 3 - Fall**

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*2060	[0.50]	Structure and Bonding
CHEM*2400	[0.75]	Analytical Chemistry I
CHEM*2880	[0.50]	Physical Chemistry

electives or restricted electives to a maximum of 2.75 total credits in this semester\*

**Winter Semester**

COOP\*1000 [0.00] Co-op Work Term I

**Semester 4 - Summer**

CHEM\*2070 [0.50] Structure and Spectroscopy  
 CHEM\*2700 [0.50] Organic Chemistry I  
 CHEM\*3430 [0.50] Analytical Chemistry II: Instrumental Analysis  
 STAT\*2040 [0.50] Statistics I

0.50 electives or restricted electives \*

**Semester 5 - Fall**

BIOC\*3570 [0.75] Analytical Biochemistry  
 CHEM\*3750 [0.50] Organic Chemistry II

One of:

CHEM\*3640 [0.50] Chemistry of the Elements I \*\*

0.50 electives or restricted electives \*

electives or restricted electives to a maximum of 2.75 total credits in this semester\*

\*\* CHEM\*3640 is a prerequisite for CHEM\*3650

**Semester 6 - Winter**

Select either Option A or Option B

**Option A (at Guelph)**

BIOC\*3560 [0.50] Structure and Function in Biochemistry  
 CHEM\*3650 [0.50] Chemistry of the Elements II  
 CHEM\*3760 [0.50] Organic Chemistry III

1.00 electives or restricted electives \*

**Option B (at Seneca)**

2.50 credits from:

XSEN\*3030 [0.50] Pharmacology and Applied Toxicology  
 XSEN\*3040 [0.50] Occupational Health and Chemistry  
 XSEN\*3060 [0.50] Pharmaceutical Analysis - Advanced  
 XSEN\*3070 [0.50] Pharmaceutical Product Formulations  
 XSEN\*3090 [0.50] Biopharmaceuticals  
 XSEN\*3200 [0.50] Pharmaceutical Organic Chemistry  
 XSEN\*3210 [0.50] Introduction to Pharmaceutical Manufacturing

Note: All XSEN courses are taught at the Seneca@York campus of Seneca College in Toronto. (For more information, go to: <http://www.chemistry.uoguelph.ca/bpchl/>)

**Summer Semester**

COOP\*2000 [0.00] Co-op Work Term II

**Fall Semester**

COOP\*3000 [0.00] Co-op Work Term III

**Semester 7 - Winter**

2.50 electives or restricted electives \*

**Summer Semester**

COOP\*4000 [0.00] Co-op Work Term IV

**Semester 8 - Fall**

One of:

CHEM\*4730 [0.50] Synthetic Organic Chemistry

CHEM\*4740 [0.50] Topics in Bio-Organic Chemistry

2.00 electives or restricted electives \*

**\* Restricted Electives**

\*\*Students are advised to pay particular attention to pre-requisite requirements when choosing individual courses, and seek advice as needed.

- MICR\*2420 [0.50] Introduction to Microbiology
- 1.00 credits from the following:
  - MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics
  - MCB\*2050 [0.50] Molecular Biology of the Cell
  - TOX\*2000 [0.50] Principles of Toxicology
- A minimum of 1.50 credits at the 4000 level and 2.50 credits at the 3000/4000 level from the following list:

BIOC\*3560 [0.50] Structure and Function in Biochemistry  
 BIOC\*4520 [0.50] Metabolic Processes  
 BIOC\*4540 [0.75] Enzymology \*\*  
 BIOC\*4580 [0.50] Membrane Biochemistry  
 BIOM\*3090 [0.50] Principles of Pharmacology \*\*  
 BIOM\*3200 [1.00] Biomedical Physiology  
 BIOM\*4090 [0.50] Pharmacology \*\*  
 CHEM\*3360 [0.50] Environmental Chemistry and Toxicology  
 CHEM\*3440 [0.50] Analytical Chemistry III: Analytical Instrumentation

CHEM\*3640 [0.50] Chemistry of the Elements I  
 CHEM\*3650 [0.50] Chemistry of the Elements II \*\*  
 CHEM\*3760 [0.50] Organic Chemistry III  
 CHEM\*4010 [0.50] Chemistry and Industry  
 CHEM\*4400 [0.50] Advanced Topics in Analytical Chemistry  
 CHEM\*4630 [0.50] Bioinorganic Chemistry \*\*

CHEM\*4720 [0.50] Organic Reactivity \*\*  
 CHEM\*4730 [0.50] Synthetic Organic Chemistry \*\*  
 CHEM\*4740 [0.50] Topics in Bio-Organic Chemistry  
 CHEM\*4900 [1.00] Chemistry Research Project I \*\*  
 CHEM\*4910 [1.00] Chemistry Research Project II \*\*  
 MBG\*3040 [0.50] Molecular Biology of the Gene \*\*  
 MBG\*3350 [0.75] Laboratory Methods in Molecular Biology I \*\*  
 MCB\*4050 [0.50] Protein and Nucleic Acid Structure \*\*  
 MICR\*3230 [0.50] Immunology  
 NUTR\*3210 [0.50] Fundamentals of Nutrition  
 PATH\*3610 [0.50] Principles of Disease  
 TOX\*4590 [0.50] Biochemical Toxicology \*\*  
 XSEN\*3030 [0.50] Pharmacology and Applied Toxicology  
 XSEN\*3040 [0.50] Occupational Health and Chemistry  
 XSEN\*3060 [0.50] Pharmaceutical Analysis - Advanced  
 XSEN\*3070 [0.50] Pharmaceutical Product Formulations  
 XSEN\*3090 [0.50] Biopharmaceuticals  
 XSEN\*3200 [0.50] Pharmaceutical Organic Chemistry  
 XSEN\*3210 [0.50] Introduction to Pharmaceutical Manufacturing

**Credit Summary (20.00 Total Credits)**

4.00 - First year science credits

6.00 - Required science courses semesters 3 – 8

5.50 - Restricted electives (#1 and #2 in restricted electives list)

0.50 - Approved Science electives

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. students. (could be less if restricted electives do not count as science)

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Biological Science (BIOS)****College of Biological Science****Major (Honours Program)**

The Biological Science major offers the opportunity to study a wide range of topics within biological science. The major is one of the most flexible within the B.Sc. After the core sciences in first and second year, students can tailor the degree to create a major all their own. With the wide breadth of courses offered, students can choose to focus their studies in one area of biological science or create a unique skill set and combination of courses not currently offered in any one of our majors. Students can also add a minor in either an area of science or arts and social science.

With this flexibility, students in the Biological Science major are encouraged to seek out study abroad opportunities through the Centre for International Programs. With a high number of elective spaces within the major, students can incorporate a study abroad and still meet the degree requirements within four years. Students who wish to pursue this option should start researching and planning in semesters 3 and 4.

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. This major will require the completion of 20.00 credits as indicated below:

**Schedule of Studies****Semester 1**

BIOL\*1090 [0.50] Introduction to Molecular and Cellular Biology  
 CHEM\*1040 [0.50] General Chemistry I  
 MATH\*1080 [0.50] Elements of Calculus I  
 PHYS\*1080 [0.50] Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

BIOL\*1070 [0.50] Discovering Biodiversity  
 BIOL\*1080 [0.50] Biological Concepts of Health  
 CHEM\*1050 [0.50] General Chemistry II  
 PHYS\*1070 [0.50] Physics for Life Sciences II

0.50 Arts or Social Science electives

**Semester 3**

BIOL\*2400 [0.50] Evolution

One of:

BIOC\*2580 [0.50] Introduction to Biochemistry

MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics

1.00 electives or restricted electives \*

0.50 Arts or Social Science elective

**Semester 4**

STAT\*2040 [0.50] Statistics I

One of:

BIOC*2580	[0.50]	Introduction to Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics

1.00 electives or restricted electives \*

0.50 Arts or Social Science elective

### Semester 5

2.50 credits of electives or restricted electives\*

Students are encouraged to consider study abroad options†

### Semester 6

2.50 credits of electives or restricted electives\*

Students are encouraged to consider study abroad options†

### Semester 7 and 8

2.50 credits of electives or restricted electives\*

†Students interested in studying abroad need to apply in the year prior to going abroad.

Students need to contact the Centre for International Programs to confirm admission requirements and to submit an application. A study abroad requires approval from the appropriate individuals and is pending available space at the host institution.

### \* Restricted Electives

\*\* **Note:** some courses may require additional prerequisites.

1. A minimum of 2.00 credits of Arts and/or Social Science electives are required. The list of approved Arts and Social Science electives for B.Sc. students is available at:

[http://www.bsc.uoguelph.ca/Approved\\_electives.shtml#arts](http://www.bsc.uoguelph.ca/Approved_electives.shtml#arts)

2. A minimum of 0.50 credits in Ecology:

BIOL*2060	[0.50]	Ecology
BOT*3050	[0.50]	Plant Functional Ecology

3. A minimum of 0.50 credits in Mathematical or Computational Science:

CIS*1000	[0.50]	Introduction to Computer Applications
CIS*1200	[0.50]	Introduction to Computing
MATH*2080	[0.50]	Elements of Calculus II
STAT*2050	[0.50]	Statistics II

4. A minimum of 0.50 credits in Physiology:

BIOM*3200	[1.00]	Biomedical Physiology
BOT*2100	[0.50]	Life Strategies of Plants
HK*2810	[0.50]	Human Physiology I - Concepts and Principles
ZOO*3600	[0.50]	Comparative Animal Physiology I **

5. 5.50 additional Biological Science credits of which 4.00 must be at the 3000 or 4000 level. The list of approved science electives is posted at <http://www.bsc.uoguelph.ca/>

### Credit Summary (20.00 Total Credits)

4.00 - First year science core

3.50 - Required science courses semesters 3 - 8 (# 2, 3 and 4 in restricted elective list)

5.50 - Approved Biological Science electives of which 4.00 must be 3000/4000 level (# 5 in restricted elective list)

3.00 - Approved Science electives of which 2.00 must be 3000/4000 level\* May include 1 of BIOL\*1020, CHEM\*1060

2.00 - Approved Arts and/or Social Science electives

2.00 - Electives

\*Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

### Biology (BIOL)

#### College of Biological Science

#### Minor (Honours Program)

A minor in Biology consists of a minimum of 5.00 credits including the following courses:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics

One of:

BIOL*2060	[0.50]	Ecology
BOT*3050	[0.50]	Plant Functional Ecology

Of the additional 3.00 credits approved science electives, students must complete a minimum of 1.50 credits at the 3000 or 4000 level, from courses offered by the following departments: Human Health and Nutritional Sciences, Integrative Biology and Molecular and Cellular Biology. BIOL\*1080 is a prerequisite for some CBS courses. This minor is restricted to students registered in B.Sc. majors in the Physical Sciences, B.A.S., and the B.A. degree programs.

### Bio-Medical Science (BIOM)

#### Department of Biomedical Sciences and Department of Human Health and Nutritional Sciences

This joint program of the [Department of Human Health and Nutritional Sciences](#) and the [Department of Biomedical Sciences](#) provides students with a broad and integrated foundational overview of human and animal health through the study of function (biochemistry and physiology), structure (anatomy and histology), and paraclinical sciences (epidemiology and pharmacology). The program prepares students well for more advanced studies or applied training in many health-related fields including clinical practice, business, government, research and education. Through the use of electives, students may structure a program emphasizing aspects of health and disease. For more information on recommended electives contact the Faculty Advisor of the major.

In addition, this program is designed to partially meet the current requirements for entry into medical schools in Ontario (a student interested in meeting these requirements should check the present admission requirements for the medical schools); as well as entry into the DVM program of the [Ontario Veterinary College](#).

Live animals and/or animal tissues are used for teaching purposes in some courses in the Bio-Medical Science Major. This must be accepted by students admitted to the program. All animals are protected under the Animals for Research Act of Ontario (1980), the Guidelines for the Care and Use of Experimental Animals ([Canadian Council on Animal Care](#)), and the [Animal Care Policies](#) of the University of Guelph.

Students who are admitted into the Bio-Medical Science major from high school must meet additional requirements to continue in the major. Continuation from first to second year is based on the cumulative average in the first two semesters (total of 5.00 credits), including the eight core courses as prescribed by the Schedule of Studies (see below). Students with a minimum average of 75% average will be guaranteed continuation in this major. For students with a 70-74.9% average, continuation will be competitive based on available spaces. Students with an average below 70% will be changed to the Biological Science major. Students may subsequently change to another B.Sc. major of their choice. B.Sc. students who wish to declare the specialization at the end of or beyond first year must apply directly to the Department of Biomedical Sciences by the last day of classes in the winter semester and meet the same requirements specified above.

Admission to the major will be based on the cumulative average in the two semesters (total of 5.00 credits) preceding application to the major (normally fall and winter). Acceptance will be competitive based on available spaces. Students with an average below 70% will not be considered for admission to the major. All decisions will be made at the end of June.

### Major (Honours Program)

A minimum of 20.00 credits is required.

#### Semester 1

BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 electives or restricted electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/reviseds>

#### Semester 2

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

0.50 electives or restricted electives

#### Semester 3 (see admission statement above)

BIOC*2580	[0.50]	Introduction to Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
STAT*2040	[0.50]	Statistics I

1.00 electives or restricted electives

#### Semester 4

MCB*2050	[0.50]	Molecular Biology of the Cell
NUTR*3210	[0.50]	Fundamentals of Nutrition

One of:

BIOM*3200	[1.00]	Biomedical Physiology
HK*2810	[0.50]	Human Physiology I - Concepts and Principles

Electives or restricted electives to a maximum of 2.50 total credits in this semester.

**Note:** If HK\*2810 is selected, then HK\*3810 must be taken in Semester 5.

#### Semester 5

BIOC*3560	[0.50]	Structure and Function in Biochemistry
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Electives or restricted electives to a maximum of 2.75 total credits in this semester. BIOM\*3210 is recommended.

**Note:** As part of the electives or restricted electives students must select HK\*3810 in semester 5 if HK\*2810 was selected in semester 4.

#### Semester 6

BIOM*3090	[0.50]	Principles of Pharmacology
PATH*3610	[0.50]	Principles of Disease
POPM*3240	[0.50]	Epidemiology

Electives or restricted electives to a maximum of 2.75 total credits in this semester.

**Semester 7**

2.50 electives or restricted electives

**Semester 8**

2.50 electives or restricted electives\*

**Restricted Electives**

1. Anatomy Elective - [1 of (BIOM\*3010, BIOM\*3040), HK\*3401/2, HK\*3501/2]
2. Immunology Elective - ANSC\*4650 or MICR\*3230
3. Advance Study Electives - 2.00 credits from BIOM\*4030, BIOM\*4050, BIOM\*4070, BIOM\*4090, BIOM\*4110, BIOM\*4150, BIOM\*4180, BIOM\*4300, BIOM\*4500, BIOM\*4510, BIOM\*4521/2, HK\*4070, HK\*4230, HK\*4340, HK\*4360, HK\*4371/2, HK\*4441/2, HK\*4460, NUTR\*4320, NUTR\*4360, NUTR\*4510, TOX\*4000
4. At least 2.00 credits of Arts and/or Social Science Electives are required. The approved list of Arts and Social Science Electives for B.Sc. students is available at: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml](http://www.bsc.uoguelph.ca/Approved_electives.shtml).

**Credit Summary (20.00 Total Credits)**

4.00 - First year science credits

5.75 - Required science courses semesters 3 – 8 (with HK 2810,3810) or 5.50 (with BIOM 3200)

4.00 - Restricted elective (with HK 3401/2 or HK 3501/2) 3.75 (with BIOM 3010, BIOM 3040) (Restricted elective #1, #2 and #3)

2.25 – 2.75 Approved Science electives depending on which anatomy and physiology courses are completed above.

2.00 - Arts and/or Social Science electives (# 4 in restricted elective list)

2.00 - Free electives - any approved elective for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Biomedical Toxicology (BTOX)****Interdisciplinary Program, Departments of Biomedical Sciences, Chemistry, School of Environmental Sciences, Molecular and Cellular Biology****Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. A minimum of 20.00 credits are required for graduation.

**Semester 1**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>**Semester 2**

BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II
STAT*2040	[0.50]	Statistics I

0.50 Arts or Social Science electives

**Semester 3**

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*2480	[0.50]	Analytical Chemistry I
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
TOX*2000	[0.50]	Principles of Toxicology

0.50 Arts or Social Science electives

**Semester 4**

CHEM*2700	[0.50]	Organic Chemistry I
MCB*2050	[0.50]	Molecular Biology of the Cell
NUTR*3210	[0.50]	Fundamentals of Nutrition
TOX*3360	[0.50]	Environmental Chemistry and Toxicology

0.50 electives or restricted electives\*

**Semester 5**

BIOC*3560	[0.50]	Structure and Function in Biochemistry
BIOM*3200	[1.00]	Biomedical Physiology
TOX*3300	[0.50]	Analytical Toxicology

0.50 electives or restricted electives\*

**Semester 6**

BIOM*3090	[0.50]	Principles of Pharmacology
PATH*3610	[0.50]	Principles of Disease

One of:

BIOM*3040	[0.75]	Medical Embryology
MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I *

Electives or restricted electives to a maximum of 2.75 total credits in this semester

**Semester 7**

NUTR*4510	[0.50]	Toxicology, Nutrition and Food
TOX*4000	[0.50]	Medical Toxicology
TOX*4590	[0.50]	Biochemical Toxicology

1.00 electives or restricted electives\*

**Semester 8**

BIOM*4090	[0.50]	Pharmacology
TOX*4100	[0.50]	Toxicological Pathology
TOX*4200	[0.50]	Topics in Toxicology

1.00 electives or restricted electives\*

**\* Restricted Electives**

At least 1.50 credits must be completed from the following list of allowable courses.

\*\*Students are advised to pay particular attention to pre-requisite requirements when choosing individual courses, and seek advice as needed.

ANSC*4650	[0.50]	Comparative Immunology
BIOM*3040	[0.75]	Medical Embryology
BIOM*4050	[0.50]	Biomedical Aspects of Aging
BIOM*4070	[0.50]	Biomedical Histology
BIOM*4150	[0.50]	Cancer Biology
CHEM*3750	[0.50]	Organic Chemistry II
CHEM*3760	[0.50]	Organic Chemistry III
CHEM*4740	[0.50]	Topics in Bio-Organic Chemistry
MBG*3040	[0.50]	Molecular Biology of the Gene
MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I
MBG*4270	[0.50]	DNA Replication, Recombination and Repair
MCB*4010	[0.50]	Advanced Cell Biology
MICR*3230	[0.50]	Immunology
NUTR*4090	[0.50]	Functional Foods and Nutraceuticals
NUTR*4320	[0.50]	Nutrition and Metabolic Control of Disease
PATH*3040	[0.50]	Principles of Parasitology
POPM*3240	[0.50]	Epidemiology
POPM*4040	[0.50]	Epidemiology of Food-borne Diseases
STAT*2050	[0.50]	Statistics II
STAT*3510	[0.50]	Environmental Risk Assessment
TOX*4900	[1.00]	Toxicology Research Project I
TOX*4910	[1.00]	Toxicology Research Project II

**Credit Summary (20.00 Total Credits)**

4.00 - First year science credits

10.75 - Required science courses semesters 3 – 8

1.50 - Restricted electives

1.50 - Arts and/or Social Science electives

2.25 - Free electives - any approved elective for B.Sc. students

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Biomedical Toxicology (Co-op) (BTOX:C)****Interdisciplinary Program, Departments of Biomedical Sciences, Chemistry, School of Environmental Sciences, Molecular and Cellular Biology**

To graduate from the Co-op program a minimum of 3 successfully completed work terms (COOP\*1000, COOP\*2000, COOP\*3000) is normally required.

**Major (Honours Program)**

A minimum of 20.00 credits are required for graduation.

**Semester 1 - Fall**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>**Semester 2 - Winter**

BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
COOP*1100	[0.00]	Introduction to Co-operative Education
PHYS*1070	[0.50]	Physics for Life Sciences II
STAT*2040	[0.50]	Statistics I

0.50 Arts or Social Science electives

**Semester 3 - Fall**

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*2480	[0.50]	Analytical Chemistry I
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics



TOX\*2000 [0.50] Principles of Toxicology  
0.50 Arts or Social Science electives

**Winter Semester**

COOP\*1000 [0.00] Co-op Work Term I

**Summer Semester**

COOP\*2000 [0.00] Co-op Work Term II

**Semester 4 - Fall**

BIOC\*3560 [0.50] Structure and Function in Biochemistry

MCB\*2050 [0.50] Molecular Biology of the Cell

NUTR\*3210 [0.50] Fundamentals of Nutrition

TOX\*3300 [0.50] Analytical Toxicology

0.50 electives or restricted electives

**Semester 5 - Winter**

CHEM\*2700 [0.50] Organic Chemistry I

BIOM\*3200 [1.00] Biomedical Physiology

TOX\*3360 [0.50] Environmental Chemistry and Toxicology

0.50 electives or restricted electives\*

**Summer Semester**

COOP\*3000 [0.00] Co-op Work Term III

**Fall Semester**

COOP\*4000 [0.00] Co-op Work Term IV

**Semester 6 - Winter**

BIOM\*3090 [0.50] Principles of Pharmacology

PATH\*3610 [0.50] Principles of Disease

One of:

BIOM\*3040 [0.75] Medical Embryology

MBG\*3350 [0.75] Laboratory Methods in Molecular Biology I \*

Electives or restricted electives to a maximum of 2.75 total credits in this semester

**Semester 7 - Fall**

NUTR\*4510 [0.50] Toxicology, Nutrition and Food

TOX\*4000 [0.50] Medical Toxicology

TOX\*4590 [0.50] Biochemical Toxicology

1.00 electives or restricted electives\*

**Semester 8 - Winter**

BIOM\*4090 [0.50] Pharmacology

TOX\*4100 [0.50] Toxicological Pathology

TOX\*4200 [0.50] Topics in Toxicology

1.00 electives or restricted electives\*

**\* Restricted Electives**

At least 1.50 credits must be completed from the following list of allowable courses.

\*\*Students are advised to pay particular attention to pre-requisite requirements when choosing individual courses, and seek advice as needed.

ANSC\*4650 [0.50] Comparative Immunology  
BIOM\*3040 [0.75] Medical Embryology  
BIOM\*4050 [0.50] Biomedical Aspects of Aging  
BIOM\*4070 [0.50] Biomedical Histology  
BIOM\*4150 [0.50] Cancer Biology  
CHEM\*3750 [0.50] Organic Chemistry II  
CHEM\*3760 [0.50] Organic Chemistry III  
CHEM\*4740 [0.50] Topics in Bio-Organic Chemistry  
MBG\*3040 [0.50] Molecular Biology of the Gene  
MBG\*3350 [0.75] Laboratory Methods in Molecular Biology I  
MBG\*4270 [0.50] DNA Replication, Recombination and Repair  
MCB\*4010 [0.50] Advanced Cell Biology  
MICR\*3230 [0.50] Immunology  
NUTR\*4090 [0.50] Functional Foods and Nutraceuticals  
NUTR\*4320 [0.50] Nutrition and Metabolic Control of Disease  
PATH\*3040 [0.50] Principles of Parasitology  
POPM\*3240 [0.50] Epidemiology  
POPM\*4040 [0.50] Epidemiology of Food-borne Diseases  
STAT\*2050 [0.50] Statistics II  
STAT\*3510 [0.50] Environmental Risk Assessment  
TOX\*4900 [1.00] Toxicology Research Project I  
TOX\*4910 [1.00] Toxicology Research Project II

**Credit Summary (20.00 Total Credits)**

4.00 - First year science credits

10.75 - Required science courses semesters 3 – 8

1.50 - Restricted electives

1.50 - Arts and/or Social Science electives

2.25 - Free electives - any approved elective for B.Sc. students

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

Last Revision: February 1, 2017

**Biotechnology (BIOT)**

Department of Molecular and Cellular Biology, College of Biological Science

**Minor (Honours Program)**

A minimum of 5.00 credits is required including:

BIOC\*3560 [0.50] Structure and Function in Biochemistry  
MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics  
MICR\*2420 [0.50] Introduction to Microbiology  
MICR\*2430 [0.50] Methods in Microbial Culture and Physiology

0.50 credits from:

ENGG\*2660 [0.50] Biological Engineering Systems I  
ENGG\*3830 [0.50] Bio-Process Engineering  
FOOD\*2410 [0.50] Introduction to Food Processing  
FOOD\*2420 [0.50] Introduction to Food Microbiology  
FOOD\*2620 [0.50] Food Engineering Principles

1.00 credits from:

ECON\*1050 [0.50] Introductory Microeconomics  
ECON\*1100 [0.50] Introductory Macroeconomics  
ECON\*2100 [0.50] Economic Growth and Environmental Quality  
ECON\*2310 [0.50] Intermediate Microeconomics  
ECON\*2410 [0.50] Intermediate Macroeconomics  
MCS\*1000 [0.50] Introductory Marketing

A minimum of 1.50 credits from:

ANSC\*4050 [0.50] Biotechnology in Animal Science  
BIOC\*4540 [0.75] Enzymology  
BIOL\*3300 [0.50] Applied Bioinformatics  
FOOD\*3270 [0.50] Industrial Microbiology  
MBG\*3660 [0.50] Genomics  
MBG\*4240 [0.50] Applied Molecular Genetics in Medicine and Biotechnology  
MCB\*4050 [0.50] Protein and Nucleic Acid Structure  
MICR\*3230 [0.50] Immunology  
MICR\*4280 [0.50] Microbial Ecology  
PBIO\*3750 [0.50] Plant Tissue Culture  
PBIO\*4750 [0.50] Genetic Engineering of Plants

**Business Economics (BECN)**

Department of Economics and Finance, College of Business and Economics

Interdisciplinary study in Business Economics is offered as a minor in the honours program. Students in this program will be counselled by the Department of Economics and Finance. It is possible for students to pursue a more intensive program in the area of business and economics; see the heading Economics (ECON) or Mathematical Economics (MAEC) in the B.A. degree and the heading Management Economics (MEF) in the B.Comm. degree.

**Minor (Honours Program)**

A minimum of 5.00 credits is required, including:

ACCT\*1220 [0.50] Introductory Financial Accounting  
ACCT\*2230 [0.50] Management Accounting  
ECON\*1050 [0.50] Introductory Microeconomics \*  
ECON\*1100 [0.50] Introductory Macroeconomics  
ECON\*2310 [0.50] Intermediate Microeconomics  
ECON\*2410 [0.50] Intermediate Macroeconomics  
ECON\*2560 [0.50] Theory of Finance

One of:

IPS\*1500 [1.00] Integrated Mathematics and Physics I  
MATH\*1030 [0.50] Business Mathematics  
MATH\*1080 [0.50] Elements of Calculus I  
MATH\*1200 [0.50] Calculus I

One of:

ECON\*2740 [0.50] Economic Statistics  
PSYC\*1010 [0.50] Making Sense of Data in Psychological Research  
SOAN\*2120 [0.50] Introductory Methods  
STAT\*2040 [0.50] Statistics I  
STAT\*2060 [0.50] Statistics for Business Decisions  
STAT\*2080 [0.50] Introductory Applied Statistics I  
STAT\*2120 [0.50] Probability and Statistics for Engineers

One of:

ECON\*3660 [0.50] Economics of Equity Markets  
ECON\*4400 [0.50] Economics of Organizations and Corporate Governance  
ENGG\*3240 [0.50] Engineering Economics  
FARE\*3310 [0.50] Operations Management  
HROB\*2090 [0.50] Individuals and Groups in Organizations  
MCS\*1000 [0.50] Introductory Marketing  
MCS\*3040 [0.50] Business and Consumer Law  
MGMT\*3320 [0.50] Financial Management

\* FARE\*1040 and FARE\*1400 may replace this course if it is required for the major.

**Chemical Physics (CHPY)**

Administered by the Office of the Dean, College of Physical and Engineering Science on behalf of the Department of Chemistry and the Department of Physics

**Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. A minimum of 20.00 credits is required. At least 1.00 credits must be from Arts and/or Social Science courses.

**Semester 1**

CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I
MATH*1160	[0.50]	Linear Algebra I

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

Students who are lacking one 4U/grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

CHEM*1050	[0.50]	General Chemistry II
CIS*1500	[0.50]	Introduction to Programming
IPS*1510	[1.00]	Integrated Mathematics and Physics II

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

**Semester 3**

CHEM*2060	[0.50]	Structure and Bonding
MATH*2200	[0.50]	Advanced Calculus I
MATH*2270	[0.50]	Applied Differential Equations
PHYS*2330	[0.50]	Electricity and Magnetism I

0.50 Arts or Social Science electives

**Semester 4**

CHEM*2070	[0.50]	Structure and Spectroscopy
CHEM*2480	[0.50]	Analytical Chemistry I
PHYS*2180	[0.50]	Experimental Techniques in Physics
PHYS*2310	[0.50]	Mechanics
PHYS*2340	[0.50]	Electricity and Magnetism II

**Semester 5**

CHEM*3860	[0.50]	Quantum Chemistry
NANO*3600	[0.50]	Computational Methods in Materials Science
PHYS*3130	[0.50]	Mathematical Physics
PHYS*3230	[0.50]	Quantum Mechanics I

One of:

CHEM*2820	[0.50]	Thermodynamics and Kinetics
PHYS*2240	[0.50]	Thermal Physics

**Semester 6**

CHEM*3430	[0.50]	Analytical Chemistry II: Instrumental Analysis
PHYS*3000	[0.50]	Optics: Fundamentals and Applications
PHYS*4040	[0.50]	Quantum Mechanics II

One of:

PHYS*4300	[0.50]	Inquiry in Physics
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0.50 electives

One of:

CHEM*3870	[0.50]	Molecular Spectroscopy
CHEM*4880	[0.50]	Topics in Advanced Physical Chemistry

**Semester 7**

CHEM*3440	[0.50]	Analytical Chemistry III: Analytical Instrumentation
PHYS*4120	[0.50]	Atomic and Molecular Physics
PHYS*4240	[0.50]	Statistical Physics II

One of:

PHYS*4001	[0.50]	Research in Physics +
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0.50 electives +

**Semester 8**

One of:

CHEM*3870	[0.50]	Molecular Spectroscopy
CHEM*4880	[0.50]	Topics in Advanced Physical Chemistry

One of:

CHEM*4900	[1.00]	Chemistry Research Project I +
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PHYS\*4002 and 0.50 electives

One of:

PHYS*4300	[0.50]	Inquiry in Physics
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0.50 electives +  
0.50 electives  
+ Students must complete either (PHYS\*4001, PHYS\*4002 in semester 7 and 8) or (CHEM\*4900 in semester 8).

+ **One of CHEM\*3870 or CHEM\*4880 is required for graduation.**

**Credit Summary (20.00 Total Credits)**

4.50	- First year science credits
12.00	- Required science courses semesters 3 – 8
1.00	- Arts and/or Social Science electives
2.50	- Free electives - any approved elective for B.Sc. students

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Chemical Physics (Co-op) (CHPY:C)**

Administered by the Office of the Dean, College of Physical and Engineering Science on behalf of the Department of Chemistry and the Department of Physics

**Major (Honours Program)**

A minimum of 20.00 credits is required. At least Students are eligible to participate in a maximum two (2) work terms commencing in the summer and must follow the academic work schedule as outlined in the Co-operative Education & Career Services website: <https://www.recruitguelph.ca/cces/>.

**Semester 1 - Fall**

CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I
MATH*1160	[0.50]	Linear Algebra I

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

Students who are lacking one 4U/grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2 - Winter**

CHEM*1050	[0.50]	General Chemistry II
CIS*1500	[0.50]	Introduction to Programming
IPS*1510	[1.00]	Integrated Mathematics and Physics II

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

**Semester 3 - Fall**

CHEM*2060	[0.50]	Structure and Bonding
COOP*1100	[0.00]	Introduction to Co-operative Education
MATH*2200	[0.50]	Advanced Calculus I
MATH*2270	[0.50]	Applied Differential Equations
PHYS*2330	[0.50]	Electricity and Magnetism I

0.50 Arts or Social Science electives

**Semester 4 - Winter**

CHEM*2070	[0.50]	Structure and Spectroscopy
CHEM*2480	[0.50]	Analytical Chemistry I
PHYS*2180	[0.50]	Experimental Techniques in Physics
PHYS*2310	[0.50]	Mechanics
PHYS*2340	[0.50]	Electricity and Magnetism II

**Summer Semester**

COOP*1000	[0.00]	Co-op Work Term I ++
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**Fall Semester**

COOP*2000	[0.00]	Co-op Work Term II ++
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**Semester 5 - Winter**

CHEM*3430	[0.50]	Analytical Chemistry II: Instrumental Analysis
PHYS*4300	[0.50]	Inquiry in Physics

One of:

CHEM*3870	[0.50]	Molecular Spectroscopy +
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0.50 electives \*

One of:

CIS*2500	[0.50]	Intermediate Programming
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0.50 electives \*

**Summer Semester**

COOP*3000	[0.00]	Co-op Work Term III ++
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**Semester 6 - Fall**

CHEM*3860	[0.50]	Quantum Chemistry
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NANO*3600	[0.50]	Computational Methods in Materials Science
PHYS*3130	[0.50]	Mathematical Physics
PHYS*3230	[0.50]	Quantum Mechanics I

One of:

CHEM*2820	[0.50]	Thermodynamics and Kinetics
PHYS*2240	[0.50]	Thermal Physics

### Winter Semester

COOP*4000	[0.00]	Co-op Work Term IV ++ (8-month work term in conjunction with COOP*5000)
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### Summer Semester

COOP*5000	[0.00]	Co-op Work Term V ++ (8-month work term in conjunction with COOP*4000)
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### Semester 7\*\* - Fall

CHEM*3440	[0.50]	Analytical Chemistry III: Analytical Instrumentation
PHYS*4240	[0.50]	Statistical Physics II

One of:

CHEM*3640	[0.50]	Chemistry of the Elements I
CHEM*3750	[0.50]	Organic Chemistry II

0.50 electives \*

1.00 electives \*

### Semester 8\*\* - Winter

PHYS*3000	[0.50]	Optics: Fundamentals and Applications
PHYS*4040	[0.50]	Quantum Mechanics II

One of:

CHEM*3870	[0.50]	Molecular Spectroscopy +
CHEM*4880	[0.50]	Topics in Advanced Physical Chemistry +

0.50 electives \*

1.00 electives \*

\* A minimum of 1.00 credits of Arts/Social Sciences electives is required for completion of this program.

\*\* A minimum of 2.00 credits in science courses at the 4000 level is required for graduation.

+ One of CHEM\*3870 or CHEM\*4880 is required for graduation.

++ Four work terms are required for the completion of the co-op degree. It is also necessary that there be at least one work term in each of Fall, Winter and Summer semesters. Therefore, one of the summer work terms could be missed and the student would still graduate successfully. Whether the student completes four or five work terms, a report is required for each work term completed. Contact the co-op faculty advisor for further details.

### Credit Summary (20.00 Total Credits)

4.50 - First year science credits

11.00 - Required science courses semesters 3 – 8

0.50 – Approved science electives

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

## Chemistry (CHEM)

Department of Chemistry, College of Physical and Engineering Science

### Major (Honours Program)

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. The major will require the completion of 20.00 credits as indicated below:

#### Semester 1

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I

0.50 Arts or Social Science electives

Students who are lacking one 4U /grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

#### Semester 2

CHEM*1050	[0.50]	General Chemistry II
IPS*1510	[1.00]	Integrated Mathematics and Physics II
MATH*1160	[0.50]	Linear Algebra I

One of

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health

#### Semester 3

BIOC*2580	[0.50]	Introduction to Biochemistry
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Last Revision: February 1, 2017

CHEM*2060	[0.50]	Structure and Bonding
CHEM*2400	[0.75]	Analytical Chemistry I
MATH*2270	[0.50]	Applied Differential Equations

Electives to a maximum of 2.75 total credits in this semester \*

### Semester 4

CHEM*2070	[0.50]	Structure and Spectroscopy
CHEM*2700	[0.50]	Organic Chemistry I
CHEM*3430	[0.50]	Analytical Chemistry II: Instrumental Analysis

1.00 electives\* or restricted electives\*\*

### Semester 5

CHEM*2820	[0.50]	Thermodynamics and Kinetics
CHEM*3640	[0.50]	Chemistry of the Elements I
CHEM*3750	[0.50]	Organic Chemistry II
CHEM*3860	[0.50]	Quantum Chemistry

0.50 electives\*

### Semester 6

CHEM*3650	[0.50]	Chemistry of the Elements II
CHEM*3760	[0.50]	Organic Chemistry III

1.50 electives\* or restricted electives\*\*

### Semester 7 and 8

CHEM*3440	[0.50]	Analytical Chemistry III: Analytical Instrumentation
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3.00 Chemistry or Biochemistry\*\*

1.50 electives\*

\*selection of electives is subject to the following:

1. At least 1.00 credits must be in the Arts & Social Sciences.
2. Approval of the Faculty Advisor must be obtained for the selection of courses not listed as restrictive electives.
3. Options for an "Area of Focus" or a minor are available. Subject areas include Biochemistry, Computing and Information Science, Earth Sciences, Environmental Sciences, Mathematical Sciences, and Physics. Please consult with your Faculty Advisor for more detail.

\*\*3.00 credits from the 3000/4000 level as follows:

1. 1.50 comprising of (CHEM\*3870 or CHEM\*4880), (CHEM\*4620 or CHEM\*4630), (CHEM\*4720 or CHEM\*4730)
2. 1.50 chosen from CHEM\*3870, CHEM\*4010, CHEM\*4400, BIOC\*4520, BIOC\*4540, BIOC\*4580, CHEM\*4620, CHEM\*4630, CHEM\*4720, CHEM\*4730, CHEM\*4740, CHEM\*4880, CHEM\*4900, CHEM\*4910, MCB\*4050, MCB\*4080, TOX\*4590

### Note:

1. Some of these courses may have to be taken in Semester 6.
2. Some of these courses are offered only in alternate years, and some have additional prerequisites for which the student must plan ahead, with the assistance of the faculty advisor.

### Credit Summary (20.00 Total Credits)

4.00 - First year science credits

7.75 - Required science courses semesters 3 – 8

3.00 - Restricted electives (#1 and 2 in restricted electives list)

1.25 – Approved science electives

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

### Minor (Honours Program)

A minor in Chemistry consists of at least 5.00 credits including the following courses:

CHEM*1040	[0.50]	General Chemistry I
CHEM*1050	[0.50]	General Chemistry II

Of the additional 4.00 credits, students will select Chemistry courses (CHEM) at the 2000 level or above including a minimum of 1.00 credits at the 3000 or 4000 level. BIOC\*2580 can be counted towards this specialization

## Chemistry (Co-op) (CHEM:C)

Department of Chemistry, College of Physical and Engineering Science

### Major (Honours Program)

The major will require the completion of 20.00 credits as indicated below.

The course content of semesters 1 to 3 is the same as listed in the regular Honours Program Major.

To graduate from the Co-op program a minimum of 4 successfully completed work terms is normally required.

#### Semester 1 - Fall

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
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CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I

0.50 Arts or Social Science electives

Students who are lacking one 4U/grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

### Semester 2 - Winter

CHEM*1050	[0.50]	General Chemistry II
COOP*1100	[0.00]	Introduction to Co-operative Education
IPS*1510	[1.00]	Integrated Mathematics and Physics II
MATH*1160	[0.50]	Linear Algebra I

One of

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health

### Semester 3 - Fall

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*2060	[0.50]	Structure and Bonding
CHEM*2400	[0.75]	Analytical Chemistry I
MATH*2270	[0.50]	Applied Differential Equations

Electives to a maximum of 2.75 total credits in this semester \*

### Winter Semester

COOP*1000	[0.00]	Co-op Work Term I
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### Semester 4 - Summer

CHEM*2070	[0.50]	Structure and Spectroscopy
CHEM*2700	[0.50]	Organic Chemistry I
CHEM*3430	[0.50]	Analytical Chemistry II: Instrumental Analysis

1.00 electives \*

### Semester 5 - Fall

CHEM*2820	[0.50]	Thermodynamics and Kinetics
CHEM*3640	[0.50]	Chemistry of the Elements I
CHEM*3750	[0.50]	Organic Chemistry II
CHEM*3860	[0.50]	Quantum Chemistry

0.50 electives \*

### Semester 6 - Winter

CHEM*3650	[0.50]	Chemistry of the Elements II
CHEM*3760	[0.50]	Organic Chemistry III

1.50 electives\* or restricted electives\*\*

### Summer Semester

COOP*2000	[0.00]	Co-op Work Term II
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### Fall Semester

COOP*3000	[0.00]	Co-op Work Term III
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### Semester 7 - Winter

2.50 electives\* or restricted electives\*\*

### Summer Semester

COOP*4000	[0.00]	Co-op Work Term IV
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### Semester 8 - Fall

CHEM*3440	[0.50]	Analytical Chemistry III: Analytical Instrumentation
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2.00 electives\* or restricted electives\*\*

\* selection of electives is subject to the following:

- At least 1.00 credits must be in the Arts & Social Sciences.
- Approval of the Faculty Advisor must be obtained for the selection of courses not listed as restrictive electives.
- Options for an "Area of Focus" or a minor are available. Subject areas include Biochemistry, Computing and Information Science, Earth Sciences, Environmental Sciences, Mathematical Sciences, and Physics. Please consult with your Faculty Advisor for more detail.

\*\* 3.00 credits from the 3000/4000 level as follows:

- 1.50 comprising of (CHEM\*3870 or CHEM\*4880), (CHEM\*4620 or CHEM\*4630), (CHEM\*4720 or CHEM\*4730)
- 1.50 chosen from CHEM\*3870, CHEM\*4010, CHEM\*4400, BIOC\*4520, BIOC\*4540, BIOC\*4580, CHEM\*4620, CHEM\*4630, CHEM\*4720, CHEM\*4730, CHEM\*4740, CHEM\*4880, CHEM\*4900, CHEM\*4910, MCB\*4050, MCB\*4080, TOX\*4590

### Note:

Some of these courses are offered only in alternate years, and some have additional prerequisites for which the student must plan ahead, with the assistance of the faculty advisor.

### Credit Summary (20.00 Total Credits)

4.00 - First year science credits

7.75 - Required science courses semesters 3 – 8

3.00 - Restricted electives (#1 and 2 in restricted electives list)

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1.25 – Approved science electives

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

## Computing and Information Science (CIS)

### School of Computer Science, College of Physical and Engineering Science

A knowledge of Computing is a complement to most areas of study. The Minor in Computing and Information Science is directed towards students who wish to supplement their studies in another area with some experience in Computing. Students interested in pursuing a Major in Computing can do so through the Bachelor of Computing Degree Program.

### Minor (Honours Program)

CIS*1500	[0.50]	Introduction to Programming
CIS*1910	[0.50]	Discrete Structures in Computing I
CIS*2170	[0.75]	User Interface Design
CIS*2430	[0.50]	Object Oriented Programming
CIS*2500	[0.50]	Intermediate Programming
CIS*2520	[0.50]	Data Structures
CIS*2750	[0.75]	Software Systems Development and Integration

0.50 additional credits from CIS courses at the 2000 level or above

0.50 additional credits from CIS courses at the 3000 level or above

## Ecology (ECOL)

### Department of Integrative Biology, College of Biological Science

This minor provides a foundation in the principles and methods of ecology. It introduces the knowledge and skills necessary for work in conservation, environmental science and education, resource management, ecological consulting, or nature interpretation.

### Minor (Honours Program)

A minimum of 5.00 credits is required to complete the minor, which must include:

BIOL*2060	[0.50]	Ecology
BIOL*3010	[0.50]	Laboratory and Field Work in Ecology
BIOL*3060	[0.50]	Populations, Communities & Ecosystems
BIOL*4110	[1.00]	Ecological Methods
BIOL*4120	[0.50]	Evolutionary Ecology

Of the remaining 2.00 required credits, students will select from the following:

At least one of:

BIOL*2400	[0.50]	Evolution
BIOL*3020	[0.50]	Population Genetics

At least one of:

BOT*2100	[0.50]	Life Strategies of Plants
ZOO*2090	[0.50]	Vertebrate Structure and Function

One of:

GEOG*1220	[0.50]	Human Impact on the Environment
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

## Environmental Biology (ENVB)

### School of Environmental Sciences, Ontario Agricultural College

The honours B.Sc. program in Environmental Biology combines a broad education in the life sciences with a more specialized understanding of the biological consequences of interactions between humans and the environment. This major prepares students for post-graduate work in environmental biology and related life sciences and provides a strong foundation for students wishing to pursue careers in teaching, government service or the private sector.

### Major (Honours Program)

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. This major requires the completion of 20.00 credits. A minimum of 16.00 of these 20.00 must be science credits.

### Semester 1

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science elective

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

### Semester 2

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

One of:

CIS*1200	[0.50]	Introduction to Computing
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CIS*1500	[0.50]	Introduction to Programming
MATH*2080	[0.50]	Elements of Calculus II
STAT*2040	[0.50]	Statistics I

0.50 Arts or Social Science elective

### Semester 3

BIOC*2580	[0.50]	Introduction to Biochemistry
ENVS*2330	[0.50]	Current Issues in Ecosystem Science and Biodiversity
STAT*2040	[0.50]	Statistics I (if not taken in semester 2)
TOX*2000	[0.50]	Principles of Toxicology

0.50 electives or restricted electives chosen from lists A, B, C and/or D (or 1.00 if STAT\*2040 was taken in semester 2)

### Semester 4

BIOL*2060	[0.50]	Ecology
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics

1.50 electives or restricted electives chosen from lists A, B, C and/or D

### Semester 5

2.50 electives or restricted electives chosen from lists A, B, C and/or D (at least 1.00 restricted electives must be selected, including at least one ENVS course)

Students are encouraged to take (ENVS\*3410 and ENVS\*3420) or ENVS\*3430 in Semesters 5 and 6.

### Semester 6

BIOL*2400	[0.50]	Evolution
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2.00 electives or restricted electives chosen from lists A, B, C and/or D

### Semester 7

2.50 electives or restricted electives chosen from lists A, B, C and/or D

Students contemplating graduate studies are encouraged to take ENVS\*4410 in semester 7 and ENVS\*4420 in semester 8, or ENVS\*4430 in either semester 7 or 8.

### Semester 8

2.50 electives or restricted electives chosen from lists A, B, C and/or D

### Restricted Electives

1. A minimum of 1.00 credits of Approved Arts and Social Science electives
2. Select 4.50 credits from the following lists of restricted electives during Semesters 3-8. 1.00 credits must be completed in each of lists A, B and C. Of the total 4.50 credits at least 1.00 of these credits must be from ENVS courses.

Students should note that some restricted electives (marked by asterisks \*\*) require other restricted electives as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

### List A - Environment & Agriculture

Minimum of 1.00 credits from the following list:

AGR*2050	[0.50]	Agroecology
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management
ENVS*3040	[0.50]	Natural Chemicals in the Environment
ENVS*3210	[0.50]	Plant Pathology
ENVS*3310	[0.50]	Soil Biodiversity and Ecosystem Function **
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests **
MICR*3220	[0.50]	Plant Microbiology
PBIO*4750	[0.50]	Genetic Engineering of Plants **

### List B - Impacts of Pollution on Living Organisms

Minimum of 1.00 credits from the following list:

BIOL*3450	[0.50]	Introduction to Aquatic Environments
BIOL*4350	[0.50]	Limnology of Natural and Polluted Waters **
BIOL*4610	[0.75]	Arctic Ecology
ENVS*3010	[0.50]	Climate Change Biology
ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3290	[0.50]	Waterborne Disease Ecology
ENVS*4180	[0.50]	Insecticide Biological Activity and Resistance
ENVS*4190	[0.50]	Biological Activity of Herbicides
GEOG*3020	[0.50]	Global Environmental Change
MBG*4270	[0.50]	DNA Replication, Recombination and Repair **
PBIO*4530	[0.50]	Plants and Environmental Pollution **
STAT*3510	[0.50]	Environmental Risk Assessment
TOX*3360	[0.50]	Environmental Chemistry and Toxicology

### List C - Conservation of Biodiversity & Natural Resources

Minimum of 1.00 credits from the following list:

BIOL*3060	[0.50]	Populations, Communities & Ecosystems
BIOL*3130	[0.50]	Conservation Biology
BIOL*4150	[0.50]	Wildlife Conservation and Management
BIOL*4500	[0.50]	Natural Resource Policy Analysis
ENVS*2120	[0.50]	Introduction to Environmental Stewardship
ENVS*3080	[0.50]	Soil and Water Conservation **
ENVS*3090	[0.50]	Insect Diversity and Biology

ENVS*3150	[0.50]	Aquatic Systems
ENVS*3230	[0.50]	Agroforestry Systems **
ENVS*3250	[0.50]	Forest Health and Disease
ENVS*3270	[0.50]	Forest Biodiversity **
ENVS*3370	[0.50]	Terrestrial Ecosystem Ecology
ENVS*4230	[0.50]	Biology of Aquatic Insects **
ENVS*4260	[0.50]	Field Entomology **
ENVS*4350	[0.50]	Forest Ecology **
ENVS*4390	[1.00]	Soil Variability and Land Evaluation

### List D - Supporting Courses

ENVS*3410	[0.50]	Independent Research I
ENVS*3420	[0.50]	Independent Research II
ENVS*3430	[1.00]	Independent Research
ENVS*3510	[0.50]	Independent Study I
ENVS*3520	[0.50]	Independent Study II
ENVS*3530	[1.00]	Independent Study
ENVS*4410	[1.00]	Advanced Independent Research I
ENVS*4420	[1.00]	Advanced Independent Research II
ENVS*4430	[2.00]	Advanced Independent Research
ENVS*4510	[0.50]	Advanced Independent Study I
ENVS*4520	[0.50]	Advanced Independent Study II
ENVS*4530	[1.00]	Advanced Independent Study

The following restricted elective courses are required as prerequisites for some courses in lists A, B and C:

BIOL*3060	[0.50]	Populations, Communities & Ecosystems
BOT*2100	[0.50]	Life Strategies of Plants
ENVS*2060	[0.50]	Soil Science
MCB*2050	[0.50]	Molecular Biology of the Cell

### Credit Summary (20.00 Total Credits)

4.00 - First year science credits

3.50 - Required science courses semesters 3 – 8 (3.00 if STAT 2040 is taken in Semester 2)

4.50 - Restricted electives (some restricted electives do not count as science electives towards degree therefore additional science electives may be required)

4.00 - Approved Science electives (4.50 if STAT 2040 is taken in semester 2, in place of CIS)

1.00 - Arts and/or Social Science electives (# 1 in restricted elective list)

3.00 - Free electives - any approved elective for B.Sc. students. (could be less if restricted electives do not count as science)

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

### Environmental Geoscience and Geomatics (EGG)

#### Department of Geography, College of Social and Applied Human Sciences

This program provides opportunities for study of the processes and properties of the biophysical environment and a core foundation in the analytical techniques (i.e. Geographical Information Science and Remote Sensing) used for their interpretation, analysis and presentation.

Graduates of the program that select courses required for a 'Professional Geoscientist' will meet the academic requirements for eligibility for membership as an Environmental Geoscientist in the Association of Professional Geoscientists of Ontario (APGO), allowing for use of the designation P. Geo. Ontario's legislation under the Professional Geoscientists Act, 2000 (the Act), requires registration with the APGO of anyone wishing to practice geoscience in Ontario. Details on the course requirements for APGO membership can be found on the [Department of Geography website](#):

### Major (Honours Program)

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult with a B.Sc. Faculty Advisor in the Department of Geography. All students are encouraged to consult with the advisor on a regular basis.

The major will require the completion of 20.00 credits as indicated below:

#### Semester 1

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
GEOG*1350	[0.50]	Earth: Hazards and Global Change
PHYS*1080	[0.50]	Physics for Life Sciences

One of:

MATH*1080	[0.50]	Elements of Calculus I
MATH*1200	[0.50]	Calculus I

Students who are lacking one 4U/grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
GEOG*1300	[0.50]	Introduction to the Biophysical Environment
PHYS*1130	[0.50]	Physics with Applications

0.50 Arts or Social Science electives\* (GEOG\*1220 is recommended)

**Semester 3**

ENVS*2240	[0.50]	Fundamentals of Environmental Geology
GEOG*2000	[0.50]	Geomorphology
GEOG*2420	[0.50]	The Earth From Space
GEOG*2480	[0.50]	Mapping and GIS

0.50 Arts or Social Science electives\*

**Semester 4**

GEOG*2110	[0.50]	Climate and the Biophysical Environment
GEOG*2210	[0.50]	Environment and Resources
STAT*2040	[0.50]	Statistics I

One of:

CIS*1200	[0.50]	Introduction to Computing
CIS*1500	[0.50]	Introduction to Programming
MATH*1210	[0.50]	Calculus II
MATH*2080	[0.50]	Elements of Calculus II

0.50 approved Science electives\*

**Semester 5**

GEOG*3000	[0.50]	Fluvial Processes
GEOG*3110	[0.50]	Biotic and Natural Resources

One of:

GEOG*3020	[0.50]	Global Environmental Change
GEOG*3090	[0.50]	Gender and Environment
GEOG*3210	[0.50]	Management of the Biophysical Environment

1.00 electives, at least 0.50 from approved Science electives\*

**Semester 6**

GEOG*3420	[0.50]	Remote Sensing of the Environment
GEOG*3480	[0.50]	GIS and Spatial Analysis
GEOG*3610	[0.50]	Environmental Hydrology

1.00 electives, at least 0.50 from approved Science electives\*

**Semester 7**

GEOG*4110	[1.00]	Environmental Systems Analysis
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1.50 electives, at least 0.50 from approved Science electives\* (GEOG\*4690 is recommended)

**Semester 8**

GEOG*4150	[0.50]	Catchment Processes
GEOG*4480	[1.00]	Applied Geomatics

1.00 Approved Science electives\*

**Credit Summary (20.00 Total Credits)**

4.50 - First year science credits

8.50 - Required science courses semesters 3 – 8

1.00 - Required social science courses semesters 3 – 8

3.00 - Approved Science electives

1.00 - Arts and/or Social Science electives

2.00 - Free electives - any approved elective for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Food Science (FOOD)**

Department of Food Science, Ontario Agricultural College

**Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor.

**Semester 1 - Fall**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Note: CIS\*1200, rather than an Arts or Social Science credit is recommended for those needing to improve their computer skills.

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2 - Winter**

BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II

MATH*2080	[0.50]	Elements of Calculus II
PHYS*1070	[0.50]	Physics for Life Sciences II

0.50 Arts or Social Science electives

**Semester 3 - Fall**

BIOC*2580	[0.50]	Introduction to Biochemistry
CHEM*2880	[0.50]	Physical Chemistry
FOOD*2150	[0.50]	Introduction to Nutritional and Food Science
MICR*2420	[0.50]	Introduction to Microbiology

0.50 electives

**Semester 4 - Winter**

FOOD*2100	[0.50]	Communication in Food Science
FOOD*2620	[0.50]	Food Engineering Principles
NUTR*3210	[0.50]	Fundamentals of Nutrition
STAT*2040	[0.50]	Statistics I

0.50 electives

**Semester 5 - Fall**

FOOD*3030	[0.50]	Food Chemistry I
FOOD*3160	[0.75]	Food Processing I
FOOD*3230	[0.75]	Food Microbiology

0.50 electives

**Semester 6 - Winter**

FOOD*3040	[0.50]	Food Chemistry II
FOOD*3170	[0.50]	Food Processing II
FOOD*3260	[0.50]	Industrial Microbiology
FOOD*3700	[0.50]	Sensory Evaluation of Foods

0.50 electives

**Semester 7 - Fall**

FOOD*4190	[0.50]	Advanced Food Analysis
FOOD*4260	[0.50]	Food Product Development I

1.50 electives

**Semester 8 - Winter**

FOOD*4270	[0.50]	Food Product Development II
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2.00 electives

**Notes:**

- ENGL\*1200 is recommended for those students needing to improve their English grammar.
- FOOD\*2150 could be replaced by FOOD\*2010 with permission of department advisor.
- Of the 6.50 electives credits:
  - At least 2.00 must be Arts or Social Sciences.
  - At least 2.00 must be from list of Restricted Electives.
  - At least 1.00 must be from additional science electives (1.50 if MCS\*3010 is chosen as a Restricted Elective)

**Restricted Electives:**

FOOD*4070	[0.50]	Food Packaging
FOOD*4090	[0.50]	Functional Foods and Nutraceuticals
FOOD*4110	[0.50]	Meat and Poultry Processing
FOOD*4220	[0.50]	Topics in Food Science
FOOD*4230	[0.50]	Research in Food Science
FOOD*4310	[0.50]	Food Safety Management Systems
FOOD*4400	[0.50]	Dairy Processing
FOOD*4520	[0.50]	Utilization of Cereal Grains for Human Food
MCS*3010	[0.50]	Quality Management
POPM*4040	[0.50]	Epidemiology of Food-borne Diseases

**Credit Summary (20.00 Total Credits)**

4.00 - 1st year science required

9.50 - Required in semesters 3-8

2.00 - Restricted electives

2.00 - Arts or Social Science electives

1.00 or 1.50 - Additional Science electives (See Note 3 above)

1.00 or 1.50 - Free electives (See Note 3 above)

Students not in the Food Science Major who are seeking further study in Food Science are encouraged to consider the Certificate in Food Science. See Special Study Opportunities, Chapter XI of the Calendar.

**Food Science (Co-op) (FOOD:C)**

Department of Food Science, Ontario Agricultural College

**Major (Honours Program)****Semester 1 - Fall**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I

PHYS\*1080 [0.50] Physics for Life Sciences

0.50 Arts or Social Science electives

Note: CIS\*1200, rather than an Arts or Social Science credit is recommended for those needing to improve their computer skills.

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

### Semester 2 - Winter

BIOL\*1080 [0.50] Biological Concepts of Health

CHEM\*1050 [0.50] General Chemistry II

MATH\*2080 [0.50] Elements of Calculus II

PHYS\*1070 [0.50] Physics for Life Sciences II

0.50 Arts or Social Science electives

### Summer Semester

Off

### Semester 3 - Fall

BIOC\*2580 [0.50] Introduction to Biochemistry

CHEM\*2880 [0.50] Physical Chemistry

COOP\*1100 [0.00] Introduction to Co-operative Education

FOOD\*2150 [0.50] Introduction to Nutritional and Food Science

MICR\*2420 [0.50] Introduction to Microbiology

0.50 electives

### Semester 4 - Winter

FOOD\*2100 [0.50] Communication in Food Science

FOOD\*2620 [0.50] Food Engineering Principles

NUTR\*3210 [0.50] Fundamentals of Nutrition

STAT\*2040 [0.50] Statistics I

0.50 electives

### Summer Semester

COOP\*1000 [0.00] Co-op Work Term I

### Semester 5 - Fall

FOOD\*3030 [0.50] Food Chemistry I

FOOD\*3160 [0.75] Food Processing I

FOOD\*3230 [0.75] Food Microbiology

0.50 electives

### Semester 6 - Winter

FOOD\*3040 [0.50] Food Chemistry II

FOOD\*3170 [0.50] Food Processing II

FOOD\*3260 [0.50] Industrial Microbiology

FOOD\*3700 [0.50] Sensory Evaluation of Foods

0.50 electives

### Summer Semester

Optional

### Fall Semester

COOP\*2000 [0.00] Co-op Work Term II

### Winter Semester

COOP\*3000 [0.00] Co-op Work Term III

### Semester 7 - Fall

FOOD\*4190 [0.50] Advanced Food Analysis

FOOD\*4260 [0.50] Food Product Development I

1.50 electives

### Semester 8 - Winter

FOOD\*4270 [0.50] Food Product Development II

2.00 electives

### Notes:

See Notes and Credit Summary in Food Science Major.

## Geographic Information Systems (GIS) and Environmental Analysis

Department of Geography, College of Social and Applied Human Sciences

### Minor (Honours Program)

A minimum of 5.00 credits is required, including the following 3.50 credits:

GEOG\*1300 [0.50] Introduction to the Biophysical Environment

GEOG\*2420 [0.50] The Earth From Space

GEOG\*2480 [0.50] Mapping and GIS

GEOG\*3420 [0.50] Remote Sensing of the Environment

GEOG\*3480 [0.50] GIS and Spatial Analysis

GEOG\*4480 [1.00] Applied Geomatics

And at least 1.50 credits from:

GEOG\*2110 [0.50] Climate and the Biophysical Environment

GEOG\*2210 [0.50] Environment and Resources

GEOG\*3110 [0.50] Biotic and Natural Resources

GEOG\*3210 [0.50] Management of the Biophysical Environment

GEOG\*4110 [1.00] Environmental Systems Analysis

GEOG\*4210 [0.50] Environmental Governance

## Human Kinetics (HK)

Department of Human Health and Nutritional Sciences, College of Biological Science

Human Kinetics is concerned with understanding capacities for, and limits of, human movement at different ages and with the role of physical activity in human health. Through the use of electives, students may structure a program emphasizing biomechanics and ergonomics, human population biology or nutrition, exercise and metabolism.

If lacking the fundamentals of word processing, spread sheet use and data management, the student should select CIS\*1200 as early in the program as possible.

### Major (Honours Program)

B.Sc. students who were not admitted directly into the Human Kinetics major from high school and subsequently wish to transfer to the specialization must apply directly to the Department of Human Health and Nutritional Science by the last day of classes in the winter semester.

To be eligible after first year, applicants must have successfully completed 4.0 science credits in a B.Sc. specialization with an average of 70% or better in BIOL\*1070, BIOL\*1080 and BIOL\*1090. For students with a 65-69.9% average in these three courses, admission to the major will be competitive based on available spaces.

Students wishing to transfer after second year or third year must have an average of 70% or better in their last two semesters (total of best 4.00 science credits). For students with a 65-69.9%, admission to the major will be competitive based on available spaces.

All decisions regarding transfers will be made by the end of June.

To complete the major, a minimum of 20.00 credits are required.

### Semester 1

BIOL\*1080 [0.50] Biological Concepts of Health

CHEM\*1040 [0.50] General Chemistry I

MATH\*1080 [0.50] Elements of Calculus I

PHYS\*1080 [0.50] Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

### Semester 2

BIOL\*1070 [0.50] Discovering Biodiversity

BIOL\*1090 [0.50] Introduction to Molecular and Cellular Biology

CHEM\*1050 [0.50] General Chemistry II

PHYS\*1070 [0.50] Physics for Life Sciences II

0.50 arts or social science electives

### Semester 3

BIOC\*2580 [0.50] Introduction to Biochemistry

HK\*2270 [0.50] Principles of Human Biomechanics

MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics

STAT\*2040 [0.50] Statistics I

0.50 Arts or Social Science electives

### Semester 4

HK\*2810 [0.50] Human Physiology I - Concepts and Principles

MCB\*2050 [0.50] Molecular Biology of the Cell

NUTR\*3210 [0.50] Fundamentals of Nutrition

0.50 electives

0.50 Arts or Social Science electives

### Semester 5

HK\*3600 [0.75] Applied Human Kinetics I

HK\*3810 [0.75] Human Physiology II - Integrated Systems

NUTR\*3360 [0.50] Lifestyle Genomics

One of

HK\*3401 [0.75] Human Anatomy: Dissection

HK\*3501 [0.75] Human Anatomy: Prosection

### Semester 6

BIOC\*3560 [0.50] Structure and Function in Biochemistry

HK\*3100 [0.50] Neuromuscular Physiology

HK\*4600 [0.75] Applied Human Kinetics II

One of

HK\*3402 [0.75] Human Anatomy: Dissection (if registered in HK\*3401 in semester 5)

HK\*3502 [0.75] Human Anatomy (if registered in HK\*3501 in semester 5)

### Semester 7

HK\*4550 [0.50] Human Cardio-respiratory Physiology

NUTR\*4210 [0.50] Nutrition, Exercise and Energy Metabolism

1.50 electives or restricted electives

### Semester 8

2.25 electives or restricted electives

**Restricted Electives**

- 2.00 credits of Approved Arts and Social Science electives.
- A minimum of 1.00 credits of restricted electives are required which must be selected from HK\*4XXX, NUTR\*4XXX (must be an approved B.Sc. Science Elective).

**Credit Summary (20.00 Total Credits)**

4.00 - First year science core

9.75 - Required science courses semesters 3 - 8

1.00 - Restricted elective (# 2 in restricted elective list)

1.25 - Approved Science electives

2.00 - Approved Arts and/or Social Science electives (#1 in restricted electives list)

2.00 - Free electives - any approved electives for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Marine and Freshwater Biology (MFB)****Department of Integrative Biology, College of Biological Science**

The Marine and Freshwater Biology major capitalizes on Guelph's recognized excellence in aquatic research and provides a broad perspective on aquatic environments based on the physical as well as the biological sciences. In this major, students will build upon core courses in ecology, evolution, genetics, and physiology of aquatic biota as they study freshwater and marine environments and work with aquatic organisms experimentally in the field and in the lab. They will have the opportunity to perform independent research projects under a variety of field and laboratory conditions to enhance their learning experience. The major prepares students for post-graduate work in the aquatic sciences, and provides a sound scientific background for students wishing to pursue careers in academia, government service, private sector (e.g., NGOs, fisheries, aquaculture, biotechnology, consulting), conservation, education and research.

**Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. A minimum total of 20.00 credits is required to complete the major.

**Semester 1**

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

0.50 Arts or Social Science electives

**Semester 3**

BIOL*2060	[0.50]	Ecology
BIOL*2400	[0.50]	Evolution
ZOO*2090	[0.50]	Vertebrate Structure and Function

1.00 electives\*

**Semester 4**

BIOC*2580	[0.50]	Introduction to Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
STAT*2230	[0.50]	Biostatistics for Integrative Biology
ZOO*2700	[0.50]	Invertebrate Morphology & Evolution

0.50 electives\*

**Semester 5**

BIOL*3450	[0.50]	Introduction to Aquatic Environments
ZOO*3600	[0.50]	Comparative Animal Physiology I
ZOO*3610	[0.25]	Lab Studies in Animal Physiology I
ZOO*3700	[0.50]	Integrative Biology of Invertebrates

Electives to a maximum of 2.75 total credits in this semester.

**Semester 6**

BIOL*3060	[0.50]	Populations, Communities & Ecosystems
ZOO*3050	[0.50]	Developmental Biology
ZOO*3620	[0.50]	Comparative Animal Physiology II
ZOO*3630	[0.25]	Lab Studies in Animal Physiology II

Electives to a maximum of 2.75 total credits in this semester.

**Semester 7**

BIOL*4350	[0.50]	Limnology of Natural and Polluted Waters
IBIO*4600	[1.00]	Integrative Marine and Freshwater Research

1.00 electives

**Semester 8**

BIOL*4010	[0.50]	Adaptational Physiology
ZOO*4330	[0.50]	Biology of Fishes
ZOO*4570	[0.50]	Marine Ecological Processes

1.00 electives

\* CIS\*1200 is recommended for those needing to improve their computer skills

**Electives**

At least 1.00 credits of Arts and/or Social Science electives are required. The list of approved Arts and Social Science electives for B.Sc. students is available at: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml#arts](http://www.bsc.uoguelph.ca/Approved_electives.shtml#arts)

**Credit Summary (20.00 Total Credits)**

4.00 - First year science core

10.00 - Required science courses semesters 3 - 8

2.00 - Approved science electives

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. Students

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Mathematical Science (MSCI)****Department of Mathematics & Statistics, College of Physical and Engineering Science****Major (Honours Program)**

Knowledge of Mathematics and Statistics is crucial for understanding our world. This unique program provides a core of both mathematics and statistics with a choice of a Mathematics stream or a Statistics stream. This major also requires the completion of an area of emphasis as listed. Students are encouraged to speak with a Program Counsellor when choosing courses for the selected stream and area of emphasis.

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. A total of 20.00 credits is required to complete the Major which includes at least 10.00 credits in Mathematics & Statistics, 0.50 credits in Computing and Information Science, and an additional 2.50 credits in an area of emphasis.

**Semester 1**

CHEM*1040	[0.50]	General Chemistry I
MATH*1160	[0.50]	Linear Algebra I

One of \*\*\*

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

1.00 credits from: IPS\*1500, or (MATH\*1080, PHYS\*1080) or (MATH\*1200, PHYS\*1080)\*

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

CHEM*1050	[0.50]	General Chemistry II
STAT*2040	[0.50]	Statistics I

One of \*\*\*

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

1.00 credits from: IPS\*1510, or (MATH\*2080, PHYS\*1010) or (MATH\*1210, PHYS\*1010)\*\*

**Semester 3**

CIS*1500	[0.50]	Introduction to Programming
MATH*2200	[0.50]	Advanced Calculus I
STAT*3100	[0.50]	Introductory Mathematical Statistics I

1.00 electives or restricted electives

**Semester 4**

MATH*2130	[0.50]	Numerical Methods
STAT*2050	[0.50]	Statistics II

1.50 electives or restricted electives (CIS\*2500 recommended)

**Semester 5**

2.50 electives or restricted electives

**Semester 6**

2.50 electives or restricted electives

**Semester 7**

2.50 electives or restricted electives

**Semester 8**

MATH*4440	[0.50]	Case Studies in Mathematics and Statistics
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2.00 electives or restricted electives



\* Students entering the major in first year are strongly advised to take IPS\*1500 or (MATH\*1200, PHYS\*1080). Students declaring the Energy and Mass Transfer, the Electricity and Systems, or the Signal Processing Area of Emphasis should take (MATH\*1200, PHYS\*1080).

\*\* Students entering the major in first year are strongly advised to take IPS\*1510 or (MATH\*1210, PHYS\*1010). Students declaring the Energy and Mass Transfer, the Electricity and Systems, or the Signal Processing Area of Emphasis should take (MATH\*1210, PHYS\*1010).

\*\*\* BIOL\*1070 and BIOL\*1090 are recommended if taking either the BINF or the BBM Area of Emphasis

### RESTRICTED ELECTIVES

- 1.00 credits of Approved Arts and/or Social Science electives
- 5.50 credits from either the Mathematics Stream or the Statistics Stream as follows:
- 2.50 credits from an Area of Emphasis

#### Mathematics Stream:

MATH*2210	[0.50]	Advanced Calculus II
MATH*2270	[0.50]	Applied Differential Equations
MATH*3160	[0.50]	Linear Algebra II
MATH*3200	[0.50]	Real Analysis

0.50 additional credits in MATH at 3000 level or above

3.00 additional credits in MATH or STAT at 3000 level or above of which at least 1.50 credits must be MATH at the 4000 level

#### Statistics Stream:

STAT*3110	[0.50]	Introductory Mathematical Statistics II
STAT*3240	[0.50]	Applied Regression Analysis

0.50 additional credits in MATH at 3000 level or above

1.00 additional credits in MATH or STAT at 2000 level or above

3.00 additional credits in MATH or STAT at 3000 level or above of which at least 1.50 credits must be STAT at the 4000 level

### AREAS OF EMPHASIS

#### BIOINFORMATICS (BINF)

The following credits must be taken:

BIOL*2400	[0.50]	Evolution
BIOL*3020	[0.50]	Population Genetics
BIOL*3040	[0.50]	Methods in Evolutionary Biology
BIOL*3300	[0.50]	Applied Bioinformatics
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics

#### BIOMATHEMATICAL OR BIostatistical MODELLING (BBM)

The following credits must be taken:

BIOL*2060	[0.50]	Ecology
BIOL*2400	[0.50]	Evolution
BIOL*3060	[0.50]	Populations, Communities & Ecosystems
BIOL*3130	[0.50]	Conservation Biology
BIOL*4150	[0.50]	Wildlife Conservation and Management

#### COMPUTER SCIENCE (CS)

The following credits must be taken:

CIS*2430	[0.50]	Object Oriented Programming
CIS*2500	[0.50]	Intermediate Programming
CIS*2520	[0.50]	Data Structures

at least 1.00 credits from:

CIS*3110	[0.50]	Operating Systems I
CIS*3190	[0.50]	Software for Legacy Systems
CIS*3490	[0.50]	The Analysis and Design of Computer Algorithms
CIS*3530	[0.50]	Data Base Systems and Concepts

**Note:** CIS\*2750 is recommended in addition to the Area of Emphasis requirements for students interested in Computer Science

#### ECONOMICS (ECON)

The following credits must be taken:

ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2310	[0.50]	Intermediate Microeconomics

at least 1.00 credits from:

ECON*3100	[0.50]	Game Theory
ECON*3710	[0.50]	Advanced Microeconomics
ECON*4710	[0.50]	Advanced Topics in Microeconomics

**Note:** ECON\*1050 and ECON\*1100 are approved Arts or Social Science electives for B.Sc. students

#### ENERGY AND MASS TRANSFER (EMT)

The following credits must be taken:

ENGG*1210	[0.50]	Engineering Mechanics I
ENGG*2230	[0.50]	Fluid Mechanics
ENGG*2400	[0.50]	Engineering Systems Analysis
ENGG*3260	[0.50]	Thermodynamics
ENGG*3430	[0.50]	Heat and Mass Transfer

**Note:** No more than 3.00 credits in ENGG courses may be taken.

#### ELECTRICITY AND SYSTEMS (EAS)

The following credits must be taken:

ENGG*1210	[0.50]	Engineering Mechanics I
ENGG*2400	[0.50]	Engineering Systems Analysis
ENGG*2450	[0.50]	Electric Circuits

at least 1.00 credits from:

ENGG*3410	[0.50]	Systems and Control Theory
ENGG*3450	[0.50]	Electronic Devices
ENGG*4460	[0.50]	Robotic Systems

**Note:** No more than 3.00 credits in ENGG courses may be taken.

#### SIGNAL PROCESSING (SP)

The following credits must be taken:

ENGG*1210	[0.50]	Engineering Mechanics I
ENGG*2400	[0.50]	Engineering Systems Analysis
ENGG*2450	[0.50]	Electric Circuits
ENGG*3390	[0.50]	Signal Processing
ENGG*4660	[0.50]	Medical Image Processing

**Note:** No more than 3.00 credits in ENGG courses may be taken.

#### INDIVIDUALIZED (IN)

It is required that 2.5 credits are taken from approved Science electives for B.Sc. students where 1.00 credits must be at the 3000 level or above.

#### Credit Summary (20.00 Total Credits)

5.00 - First year science credits

3.00 - Required science courses semesters 3 – 8

8.00 - Restricted electives (Stream and Area of Emphasis)

1.00 - Arts and/or Social Science electives (# 1 in restricted elective list)

3.00 - Free electives - any approved elective for B.Sc. students. (Could be less if restricted electives do not count as science)

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

#### Minor (Honours Program)

This requires 1.00 calculus credits and 4.00 other credits chosen from mathematics, statistics, and computing and information science. For these 4.00 credits students will choose at least 0.50 from each discipline. At least 1.00 credits must be at the 3000 level or above. CIS\*2050 and CIS\*3000 cannot be counted toward this minor. This minor cannot be combined with a major in Mathematics, Statistics, or Bachelor of Computing program.

#### Mathematics (MATH)

##### Department of Mathematics and Statistics, College of Physical and Engineering Science

Knowledge of mathematics is crucial for understanding our world. The Minor in Mathematics is designed to provide considerable flexibility for students to pursue their own mathematical interests, whether they be in the concepts of "pure" mathematics or techniques and applications. Students minoring in Mathematics will develop skills that are valued in many sectors such as business, education, government, and industry.

#### Minor (Honours Program)

A total of 5.00 credits is required to complete the Minor, including:

(MATH\*1080 or MATH\*1200)\*

(MATH\*1210 or MATH\*2080)\*\*

MATH*1160	[0.50]	Linear Algebra I
MATH*2200	[0.50]	Advanced Calculus I
STAT*2040	[0.50]	Statistics I

1.00 additional Mathematics credits at the 2000 level or above.

1.50 additional Mathematics credits at the 3000 or 4000 level.

\* IPS\*1500 can count toward this 0.50 credit

\*\* IPS\*1510 can count toward this 0.50 credit

#### Microbiology (MICR)

##### Department of Molecular and Cellular Biology, College of Biological Science

Microbiology programs are designed to give students a good understanding of microorganisms, including diversity, ecology, physiology, molecular genetics, current approaches in bacterial genomics/proteomics, and microbial associations with animal hosts and the environments. Such knowledge will provide the basis for further work with microbes in medicine, agricultural industries (including biotechnology, pharmaceuticals, food and beverage) and the environment (surveillance and bioremediation).

Students can take the B.Sc. program with a Major in Microbiology, or combine the minor with another major. Students should plan their programs in consultation with the microbiology faculty advisor. As course offerings may change during the program, students are strongly encouraged to review their plans at least once a year with their advisors, and to check the departmental website for program news.

**Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor.

**Semester 1**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

0.50 Arts or Social Science electives

**Semester 3**

BIOC*2580	[0.50]	Introduction to Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MICR*2420	[0.50]	Introduction to Microbiology
STAT*2040	[0.50]	Statistics I

0.50 Arts or Social Science electives

**Semester 4**

BIOC*3560	[0.50]	Structure and Function in Biochemistry
MCB*2050	[0.50]	Molecular Biology of the Cell
MICR*2430	[0.50]	Methods in Microbial Culture and Physiology

0.50 electives

0.50 Arts or Social Science electives

**Semester 5**

MBG*3080	[0.50]	Bacterial Genetics
MICR*3420	[0.50]	Microbial Diversity

1.50 electives or restricted electives

**Semester 6**

MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I
MICR*3260	[0.50]	Microbial Adaptation
MICR*3430	[0.50]	Microbiology Methods II

A minimum of 0.75 electives or restricted electives

**Semester 7**

2.50 electives or restricted electives which can include MCB\*4500

**Semester 8**

2.50 electives or restricted electives which can include MCB\*4510

**Restricted Electives**

1. A minimum of 2.00 credits of Arts and/or Social Science electives are required. The list of approved Arts and Social Science electives for B.Sc. students is available at: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml#arts](http://www.bsc.uoguelph.ca/Approved_electives.shtml#arts)

2. 3.50 restricted elective credits of which 1.00 credits must be at the 4000 level.

BIOC*4540	[0.75]	Enzymology
BIOC*4580	[0.50]	Membrane Biochemistry
ENVS*3290	[0.50]	Waterborne Disease Ecology
FOOD*3230	[0.75]	Food Microbiology
FOOD*3240	[0.50]	Food Microbiology
FOOD*3260	[0.50]	Industrial Microbiology
FOOD*3270	[0.50]	Industrial Microbiology
FOOD*4400	[0.50]	Dairy Processing
MCB*3010	[0.50]	Dynamics of Cell Function and Signaling
MCB*4500	[1.00]	Research Project in Molecular & Cellular Biology I
MCB*4510	[1.00]	Research Project in Molecular & Cellular Biology
MCB*4600	[0.50]	Topics in Molecular and Cellular Biology
MICR*3090	[0.50]	Mycology
MICR*3220	[0.50]	Plant Microbiology
MICR*3230	[0.50]	Immunology
MICR*3330	[0.50]	World of Viruses
MICR*4010	[0.50]	Pathogenic Bacteriology
MICR*4280	[0.50]	Microbial Ecology
MICR*4330	[0.50]	Molecular Virology
MICR*4430	[0.50]	Medical Virology
MICR*4520	[0.50]	Microbial Cell Biology
MICR*4530	[0.50]	Immunology II
PATH*3040	[0.50]	Principles of Parasitology

**Credit Summary (20.00 Total Credits)**

4.00 - First year science core

6.25 - Required science courses semesters 3 - 8

3.50 - Restricted electives (#2 in restricted electives list)

2.25 - Approved Science electives

2.00 - Approved Arts and/or Social Science electives (#1 in restricted electives list)

2.00 - Free electives - any approved electives for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Minor (Honours Program)**

The minor in Microbiology consists of the following 5.00 credits including:

BIOC*3560	[0.50]	Structure and Function in Biochemistry
MICR*2420	[0.50]	Introduction to Microbiology
MICR*2430	[0.50]	Methods in Microbial Culture and Physiology

A minimum of 2.50 credits from:

FOOD*3230	[0.75]	Food Microbiology
FOOD*3240	[0.50]	Food Microbiology
FOOD*3260	[0.50]	Industrial Microbiology
FOOD*3270	[0.50]	Industrial Microbiology
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MBG*3080	[0.50]	Bacterial Genetics
MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I
MICR*3090	[0.50]	Mycology
MICR*3220	[0.50]	Plant Microbiology
MICR*3230	[0.50]	Immunology
MICR*3260	[0.50]	Microbial Adaptation
MICR*3330	[0.50]	World of Viruses
MICR*3420	[0.50]	Microbial Diversity
MICR*3430	[0.50]	Microbiology Methods II

1.00 credits from:

MICR*4010	[0.50]	Pathogenic Bacteriology
MICR*4280	[0.50]	Microbial Ecology
MICR*4330	[0.50]	Molecular Virology
MICR*4430	[0.50]	Medical Virology
MICR*4520	[0.50]	Microbial Cell Biology
MICR*4530	[0.50]	Immunology II

**Microbiology (Co-op) (MICR:C)****Department of Molecular and Cellular Biology, College of Biological Science**

Students in the Major in Microbiology program may take the Co-op option. Students do not begin their first work term until they have completed semester 4 and courses BIOL\*1070, BIOL\*1080, BIOL\*1090 and MICR\*2430. Students in the co-op program must also complete COOP\*1100. COOP \*1100 is taken in semester 3. At least 3 work terms (COOP\*1000, COOP\*2000, COOP\*3000) are required in the co-op program, and the course requirements are the same as shown for the major program. Some courses must be taken during a different semester than usual, and Co-op students generally require an additional semester to meet all the program requirements. Students should plan their programs in consultation with the faculty advisor. A total of 20.00 credits are required to complete the major.

**Major (Honours Program)****Semester 1 - Fall**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2 - Winter**

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

0.50 Arts or Social Science electives

**Summer Semester**

No academic semester or work term

**Semester 3 - Fall**

BIOC*2580	[0.50]	Introduction to Biochemistry
COOP*1100	[0.00]	Introduction to Co-operative Education
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MICR*2420	[0.50]	Introduction to Microbiology
STAT*2040	[0.50]	Statistics I

0.50 Arts or Social Science electives

**Semester 4 - Winter**

BIOC*3560	[0.50]	Structure and Function in Biochemistry
MCB*2050	[0.50]	Molecular Biology of the Cell
MICR*2430	[0.50]	Methods in Microbial Culture and Physiology

0.50 electives

0.50 Arts or Social Science electives

**Summer Semester**

COOP*1000	[0.00]	Co-op Work Term I
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**Semester 5 - Fall**

MBG*3080	[0.50]	Bacterial Genetics
MICR*3420	[0.50]	Microbial Diversity

1.50 electives or restricted electives

**Semester 6 - Winter**

MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I
MICR*3260	[0.50]	Microbial Adaptation
MICR*3430	[0.50]	Microbiology Methods II

A minimum of 0.75 electives or restricted electives

**Summer - Semester**

Optional

**Fall Semester**

COOP*2000	[0.00]	Co-op Work Term II
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**Winter Semester**

COOP*3000	[0.00]	Co-op Work Term III
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**Semester 7 - Fall**

2.50 electives or restricted electives which can include MCB\*4500

**Semester 8 - Winter**

2.50 electives or restricted electives which can include MCB\*4510

**Restricted Electives**

1. A minimum of 2.00 credits of Arts and/or Social Science electives are required. The list of approved Arts and Social Science electives for B.Sc. students is available at: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml#arts](http://www.bsc.uoguelph.ca/Approved_electives.shtml#arts)

2. 3.50 restricted elective credits of which 1.00 credits must be at the 4000 level.

BIOC*4540	[0.75]	Enzymology
BIOC*4580	[0.50]	Membrane Biochemistry
ENVS*3290	[0.50]	Waterborne Disease Ecology
FOOD*3230	[0.75]	Food Microbiology
FOOD*3240	[0.50]	Food Microbiology
FOOD*3260	[0.50]	Industrial Microbiology
FOOD*3270	[0.50]	Industrial Microbiology
FOOD*4400	[0.50]	Dairy Processing
MCB*3010	[0.50]	Dynamics of Cell Function and Signaling
MCB*4500	[1.00]	Research Project in Molecular & Cellular Biology I

MCB*4510	[1.00]	Research Project in Molecular & Cellular Biology
MCB*4600	[0.50]	Topics in Molecular and Cellular Biology
MICR*3090	[0.50]	Mycology
MICR*3220	[0.50]	Plant Microbiology
MICR*3230	[0.50]	Immunology
MICR*3330	[0.50]	World of Viruses
MICR*4010	[0.50]	Pathogenic Bacteriology
MICR*4280	[0.50]	Microbial Ecology
MICR*4330	[0.50]	Molecular Virology
MICR*4430	[0.50]	Medical Virology
MICR*4520	[0.50]	Microbial Cell Biology
MICR*4530	[0.50]	Immunology II
PATH*3040	[0.50]	Principles of Parasitology

**Credit Summary (20.00 Total Credits)**

4.00 - First year science core

6.25 - Required science courses semesters 3 - 8

3.50 - Restricted electives (# 2 in restricted electives list)

2.25 - Approved Science electives

2.00 - Approved Arts and/or Social Science electives (#1 in restricted electives)

2.00 - Free electives - any approved electives for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Molecular Biology and Genetics (MBG)****Department of Molecular and Cellular Biology, College of Biological Science**

The B.Sc. program with a Major in Molecular Biology and Genetics is a broadly based program in genetics including related areas of cell and molecular biology. In consultation with the Faculty Advisor, students can choose a general program or can focus their courses in areas such as molecular biology, cell biology, developmental biology, genetics, or agricultural genetics. The program qualifies students for postgraduate training in cell or molecular biology and genetics including clinical genetics and genetic counselling, and provides an excellent background for careers in biotechnology, toxicology, agriculture and medical research. Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor.

**Major (Honours Program)**

A total of 20.00 credits is required to complete the major.

**Semester 1**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

0.50 Arts or Social Science electives

**Semester 3**

BIOC*2580	[0.50]	Introduction to Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MICR*2420	[0.50]	Introduction to Microbiology
STAT*2040	[0.50]	Statistics I

0.50 Arts or Social Science electives

**Semester 4**

BIOC*3560	[0.50]	Structure and Function in Biochemistry
MCB*2050	[0.50]	Molecular Biology of the Cell
MICR*2430	[0.50]	Methods in Microbial Culture and Physiology
STAT*2050	[0.50]	Statistics II

0.50 Arts or Social Science electives

**Semester 5**

MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics
MBG*3040	[0.50]	Molecular Biology of the Gene
MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I

Electives or restricted electives to a maximum of 2.75 total credits in this semester.

**Semester 6**

2.50 electives or restricted electives

**Semester 7\***

MCB*4500	[1.00]	Research Project in Molecular & Cellular Biology I
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1.50 electives or restricted electives

**Semester 8\***

MCB*4510	[1.00]	Research Project in Molecular & Cellular Biology
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1.50 electives or restricted electives

\*instead of the 2 semester sequence of MCB\*4500 / MCB\*4510 students may choose to take MCB\*4600 and 1.50 subject area electives at the 4000 level.

**Restricted Electives**

1. At least 2.00 Arts and/or Social Science electives are required. The list of approved Arts and Social Science electives for B.Sc. students is available at: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml#arts](http://www.bsc.uoguelph.ca/Approved_electives.shtml#arts)

2. Physiology Elective - 0.50 credits

BIOM*3200	[1.00]	Biomedical Physiology
BOT*3310	[0.50]	Plant Growth and Development
HK*2810	[0.50]	Human Physiology I - Concepts and Principles
ZOO*3600	[0.50]	Comparative Animal Physiology I

3. Subject Area Electives - 2.50 credits (4.50 if MCB\*4600 is taken instead of MCB\*4500 and MCB\*4510)

BIOL*3020	[0.50]	Population Genetics
BIOL*3300	[0.50]	Applied Bioinformatics
MBG*3050	[0.50]	Human Genetics
MBG*3060	[0.50]	Quantitative Genetics
MBG*3080	[0.50]	Bacterial Genetics
MBG*3100	[0.50]	Plant Genetics
MBG*3360	[0.75]	Laboratory Methods in Molecular Biology II
MBG*3660	[0.50]	Genomics
MBG*4030	[0.50]	Animal Breeding Methods and Applications
MBG*4040	[0.50]	Genetics and Molecular Biology of Development

MBG*4110	[0.50]	Epigenetics
MBG*4160	[0.50]	Plant Breeding
MBG*4240	[0.50]	Applied Molecular Genetics in Medicine and Biotechnology
MBG*4270	[0.50]	DNA Replication, Recombination and Repair
MBG*4300	[0.50]	Plant Molecular Genetics
MCB*3010	[0.50]	Dynamics of Cell Function and Signaling
MCB*4010	[0.50]	Advanced Cell Biology
MCB*4050	[0.50]	Protein and Nucleic Acid Structure
MICR*3330	[0.50]	World of Viruses
MICR*4330	[0.50]	Molecular Virology

**Credit Summary (20.00 Total Credits)**

4.00 - First year science core

7.75 - Required science courses semesters 3 - 8

3.00 - Restricted electives (#2 and 3 in restricted electives list)

1.25 - Approved science electives

2.00 - Arts and/or Social Science electives (#1 in the restricted electives list)

2.00 - Free electives - any approved elective for B.Sc. Students

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Minor (Honours Program)**

A minor in Molecular Biology and Genetics requires 5.00 credits in Molecular Biology and Genetics chosen in consultation with the faculty advisor, and will include:

MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MCB*2050	[0.50]	Molecular Biology of the Cell

A minimum of 4.00 credits from:

BIOC*3560	[0.50]	Structure and Function in Biochemistry
BIOL*3020	[0.50]	Population Genetics
BIOL*3300	[0.50]	Applied Bioinformatics
MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics
MBG*3040	[0.50]	Molecular Biology of the Gene
MBG*3050	[0.50]	Human Genetics
MBG*3060	[0.50]	Quantitative Genetics
MBG*3080	[0.50]	Bacterial Genetics
MBG*3100	[0.50]	Plant Genetics
MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I
MBG*3660	[0.50]	Genomics
MBG*4030	[0.50]	Animal Breeding Methods and Applications
MBG*4040	[0.50]	Genetics and Molecular Biology of Development
MBG*4110	[0.50]	Epigenetics
MBG*4160	[0.50]	Plant Breeding
MBG*4240	[0.50]	Applied Molecular Genetics in Medicine and Biotechnology
MBG*4270	[0.50]	DNA Replication, Recombination and Repair
MBG*4300	[0.50]	Plant Molecular Genetics
MCB*3010	[0.50]	Dynamics of Cell Function and Signaling
MCB*4010	[0.50]	Advanced Cell Biology
MCB*4050	[0.50]	Protein and Nucleic Acid Structure
MICR*3330	[0.50]	World of Viruses
MICR*4330	[0.50]	Molecular Virology

**Nanoscience (NANO)**

Administered jointly by the Department of Chemistry and the Department of Physics, College of Physical and Engineering Science.

**Major (Honours Program)**

The major will require the completion of 20.00 credits as indicated below.

**Semester 1**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I
NANO*1000	[0.50]	Introduction to Nanoscience

Students who are lacking one 4U/grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

CHEM*1050	[0.50]	General Chemistry II
IPS*1510	[1.00]	Integrated Mathematics and Physics II
MATH*1160	[0.50]	Linear Algebra I

One of

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health

**Semester 3**

CHEM*2060	[0.50]	Structure and Bonding
MATH*2270	[0.50]	Applied Differential Equations
NANO*2000	[0.50]	Synthesis and Characterization of Nanomaterials I
PHYS*2330	[0.50]	Electricity and Magnetism I

One of

CHEM*2820	[0.50]	Thermodynamics and Kinetics
PHYS*2240	[0.50]	Thermal Physics

**Semester 4**

CHEM*2070	[0.50]	Structure and Spectroscopy
NANO*2100	[0.50]	Synthesis and Characterization of Nanomaterials II
PHYS*2310	[0.50]	Mechanics

1.00 electives\*

**Semester 5**

One of:

CHEM*3860	[0.50]	Quantum Chemistry
PHYS*3230	[0.50]	Quantum Mechanics I
NANO*3500	[0.50]	Thin Film Science
NANO*3600	[0.50]	Computational Methods in Materials Science

1.00 electives

**Semester 6**

NANO*3200	[0.50]	Nanolithographic Techniques
NANO*3300	[0.50]	Spectroscopy of Nanomaterials

1.50 electives

**Semester 7**

NANO*4100	[0.50]	Biological Nanomaterials
NANO*4700	[0.50]	Concepts in Quantum Computing

1.50 electives

**Semester 8**

NANO*4200	[0.50]	Topics in Nanomaterials
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2.00 electives

\* To take PHYS\*3230 in semester 5, PHYS\*2340 must be selected as an elective in semester 4.

**Note:** In semesters 7 and 8, the student must select to do either NANO\*4900 or NANO\*4910.

**Areas of Focus**

In completing the science requirements for the degree, some suggested complementary areas of focus are:

**Chemistry: Inorganic**

Semester 4:	CHEM*2480
Semester 5:	CHEM*3640
Semester 6:	CHEM*3650
Semester 7:	CHEM*4620
Semester 8:	CHEM*2700

**Chemistry: Organic**

Semester 4:	CHEM*2700
Semester 5:	CHEM*3750
Semester 6:	CHEM*3760
Semester 7:	CHEM*4730
Semester 8:	CHEM*2480, CHEM*4720

**Chemistry: Physical/Analytical**

Semester 4:	CHEM*2480
Semester 5:	CHEM*3860
Semester 6:	CHEM*3430 or CHEM*3870
Semester 7:	CHEM*3440
Semester 8:	CHEM*3430 or CHEM*3870

**Engineering**

Semester 2:	CIS*1500
Semester 4:	ENGG*2450
Semester 5:	ENGG*2410, ENGG*3450
Semester 6:	ENGG*4550
Semester 7:	ENGG*4080

**Mathematics and Statistics**

Semester 4:	STAT*2040
Semester 5:	STAT*3100
Semester 6:	MATH*2130
Semester 8:	MATH*3160, MATH*4240

**Physics**

Semester 4:	PHYS*2340
Semester 5:	MATH*2200, PHYS*3130
Semester 6:	PHYS*3000

Semester 7: PHYS\*4180, PHYS\*4240

Semester 8: PHYS\*4040, PHYS\*4150

\*Note: Courses marked with an asterisk may require additional prerequisites. Students should consult the relevant course descriptions for further information.

### Credit Summary (20.00 Total Credits)

4.50 - First year science credits

8.00 - Required science courses semesters 3 – 8

0.50 or 1.00- Restricted electives (either NANO 4900 (1.00) or NANO 4910 (0.50) )

2.50 to 3.00 - Approved Science electives (depending on restricted elective chosen above)

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. students. (could be less if restricted electives do not count as science)

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

### Nanoscience (NANO:C)

Administered jointly by the Department of Chemistry and the Department of Physics, College of Physical and Engineering Science

#### Major (Honours Program)

The major will require the completion of 20.00 credits as indicated below. To graduate from the co-op program, a minimum of 4 successfully completed work terms is normally required. Students are eligible to participate in a maximum two (2) work terms commencing in the summer and must follow the academic work schedule as outlined in the Co-operative Education & Career Services website: <https://www.recruitguelph.ca/cecs/>.

#### Semester 1 - Fall

BIOL\*1090 [0.50] Introduction to Molecular and Cellular Biology

CHEM\*1040 [0.50] General Chemistry I

IPS\*1500 [1.00] Integrated Mathematics and Physics I

NANO\*1000 [0.50] Introduction to Nanoscience

Students who are lacking one 4U/grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

#### Semester 2 - Winter

CHEM\*1050 [0.50] General Chemistry II

IPS\*1510 [1.00] Integrated Mathematics and Physics II

MATH\*1160 [0.50] Linear Algebra I

One of:

BIOL\*1070 [0.50] Discovering Biodiversity

BIOL\*1080 [0.50] Biological Concepts of Health

#### Semester 3 - Fall

CHEM\*2060 [0.50] Structure and Bonding

COOP\*1100 [0.00] Introduction to Co-operative Education

MATH\*2270 [0.50] Applied Differential Equations

NANO\*2000 [0.50] Synthesis and Characterization of Nanomaterials I

PHYS\*2330 [0.50] Electricity and Magnetism I

One of:

CHEM\*2820 [0.50] Thermodynamics and Kinetics

PHYS\*2240 [0.50] Thermal Physics

#### Semester 4 - Winter

CHEM\*2070 [0.50] Structure and Spectroscopy

NANO\*2100 [0.50] Synthesis and Characterization of Nanomaterials II

PHYS\*2310 [0.50] Mechanics

1.00 electives\*

#### Summer Semester

COOP\*1000 [0.00] Co-op Work Term I

#### Semester 5 - Fall

NANO\*3600 [0.50] Computational Methods in Materials Science

NANO\*3500 [0.50] Thin Film Science

One of:

CHEM\*3860 [0.50] Quantum Chemistry

PHYS\*3230 [0.50] Quantum Mechanics I

1.00 electives

#### Winter Semester

COOP\*2000 [0.00] Co-op Work Term II  
(8-month work term in conjunction with COOP\*3000)

#### Summer Semester

COOP\*3000 [0.00] Co-op Work Term III  
(8-month work term in conjunction with COOP\*2000)

#### Semester 6 - Fall

NANO\*4100 [0.50] Biological Nanomaterials

NANO\*4700 [0.50] Concepts in Quantum Computing  
1.50 electives

#### Semester 7 - Winter

NANO\*3200 [0.50] Nanolithographic Techniques

NANO\*3300 [0.50] Spectroscopy of Nanomaterials

1.50 electives

#### Summer Semester

COOP\*4000 [0.00] Co-op Work Term IV

#### Fall Semester

COOP\*5000 [0.00] Co-op Work Term V

#### Semester 8 -- Winter

NANO\*4200 [0.50] Topics in Nanomaterials

2.00 electives

\* To take PHYS\*3230 in semester 5, then PHYS\*2340 must be selected as an elective in semester 4.

Note: Four work terms are required for the completion of the co-op degree. It is also necessary that there be at least one work term in each of Winter, Fall, and Summer semesters. Therefore, one of the summer work terms could be missed and the student would still graduate successfully. It is only required to complete 4 of the 5 listed work terms. A report is required for each work term completed, even when all 5 are done. Contact the co-op faculty advisor for further details.

Note: In semesters 7 and 8, the student must select to do either NANO\*4900 or NANO\*4910.

### Credit Summary (20.00 Total Credits)

4.50 - First year science credits

8.00 - Required science courses semesters 3 – 8

0.50 or 1.00 - Restricted electives (either NANO 4900 (1.00) or NANO 4910 (0.50))

2.50 to 3.00 - Approved Science electives (depending on restricted elective chosen above)

1.00 - Arts and/or Social Science electives

3.00 - Free electives - any approved elective for B.Sc. students. (could be less if restricted electives do not count as science)

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

### Neuroscience (NEUR)

Departments of Biomedical Sciences (Ontario Veterinary College), Human Health and Nutritional Sciences (College of Biological Science), Molecular & Cellular Biology (College of Biological Science), and Psychology (College of Social and Applied Human Science).

#### Major (Honours Program)

This Honours program provides a foundation in the natural sciences and an opportunity to develop advanced knowledge of nervous system structure and function, and the skills required for independent inquiry within neuroscience. The specialization is unique in its emphasis on integrative/interdisciplinary problem solving. Through the use of electives, students may structure a program that emphasizes molecular and biomedical neuroscience, behavioural and cognitive neuroscience, or comparative neuroscience.

The major prepares students for professional programs in health science (medical, physiotherapy, pharmacy, veterinary medicine, nursing), post-graduate degrees in neuroscience research, and provides a strong foundation for students wishing to pursue careers in the pharmaceutical and biotechnology industries, public health, teaching, and scientific publishing & journalism.

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult with a Faculty Advisor. A minimum total of 20.00 credits is required to complete the major.

#### Semester 1

BIOL\*1080 [0.50] Biological Concepts of Health

CHEM\*1040 [0.50] General Chemistry I

MATH\*1080 [0.50] Elements of Calculus I

PHYS\*1080 [0.50] Physics for Life Sciences

0.50 Arts or Social Science elective

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

#### Semester 2

BIOL\*1070 [0.50] Discovering Biodiversity

BIOL\*1090 [0.50] Introduction to Molecular and Cellular Biology

CHEM\*1050 [0.50] General Chemistry II

PHYS\*1070 [0.50] Physics for Life Sciences II

PSYC\*1000 [0.50] Introduction to Psychology

#### Semester 3

BIOC\*2580 [0.50] Introduction to Biochemistry

MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics

NEUR*2000	[0.50]	Introduction to Neuroscience
One of:		
STAT*2040	[0.50]	Statistics I
PSYC*1010	[0.50]	Making Sense of Data in Psychological Research

0.50 Arts or Social Science elective

#### Semester 4

BIOM*3000	[0.50]	Functional Mammalian Neuroanatomy
MCB*2050	[0.50]	Molecular Biology of the Cell
PHYS*2030	[0.50]	Biophysics of Excitable Cells

1.00 electives or restricted electives

Note: 0.50 credits in physiology from restricted elective list # 3 must be taken before registering in BIOM\*3090 in semester 6.

#### Semester 5

NEUR*3100	[0.50]	Molecular Biology of Neurodevelopmental and Degenerative Disease
PSYC*3270	[0.50]	Cognitive Neuroscience
PSYC*3410	[0.50]	Behavioural Neuroscience II

1.00 electives or restricted electives

Note: 0.50 credits in physiology from restricted elective list # 3 must be taken before registering in BIOM\*3090 in semester 6.

#### Semester 6

BIOM*3090	[0.50]	Principles of Pharmacology
NEUR*3500	[0.50]	Techniques in Neuroscience

1.50 electives or restricted electives

#### Semester 7

NEUR*4000	[0.50]	Current Issues in Neuroscience
NEUR*4100	[0.50]	Neuropharmacology

1.50 electives or restricted electives

#### Semester 8

2.50 electives or restricted electives

#### Restricted Electives

Students are advised to pay particular attention to pre-requisite requirements when choosing individual courses, and seek advice as needed. \*Indicates courses that require additional prerequisites.

1. A minimum of 0.50 credits of Critical thinking/ Philosophy / Ethics from:

BIOM*3210	[0.50]	Critical Thinking in the Health Sciences
PHIL*2100	[0.50]	Critical Thinking
PHIL*2110	[0.50]	Formal Logic
PHIL*2120	[0.50]	Ethics
PHIL*2180	[0.50]	Philosophy of Science
PHIL*2240	[0.50]	Knowledge and Belief

**Note:** if a PHIL course is completed from this list, students are required to take an additional 0.50 credit approved science course as an elective to ensure the total science requirement is met.

2. A minimum of 0.50 credits of Developmental biology

BIOM*3040	[0.75]	Medical Embryology
MBG*3040	[0.50]	Molecular Biology of the Gene
MBG*4040	[0.50]	Genetics and Molecular Biology of Development
ZOO*3050	[0.50]	Developmental Biology

3. A minimum of 0.50 credits of Physiology

BIOM*3200	[1.00]	Biomedical Physiology
HK*2810	[0.50]	Human Physiology I - Concepts and Principles
ZOO*3600	[0.50]	Comparative Animal Physiology I

4. A minimum of 1.00 credits of Independent Study

This requirement can be met by taking a literature study or research course. For students who are interested in graduate studies, a research course is recommended.

\*Indicates courses that have additional prerequisites.

\*\* faculty advisor will determine if this course is an eligible science elective, depending on the instructor and topic

BIOM*4500	[0.50]	Literature-based Research in Biomedical Sciences
BIOM*4510	[1.00]	Research in Biomedical Sciences
BIOM*4521/2	[2.00]	Research in Biomedical Sciences
HK*4230	[0.50]	Advanced Study in Human Health and Nutritional Sciences
HK*4360	[1.00]	Research in Human Health and Nutritional Sciences
HK*4371/2	[1.00]	Research in Human Health and Nutritional Sciences II
IBIO*4500	[0.75]	Research in Integrative Biology I
IBIO*4510	[0.75]	Research in Integrative Biology II
IBIO*4521/2	[2.00]	Thesis in Integrative Biology
MCB*4500	[1.00]	Research Project in Molecular & Cellular Biology I *

MCB*4510	[1.00]	Research Project in Molecular & Cellular Biology *
MCB*4600	[0.50]	Topics in Molecular and Cellular Biology *
NEUR*4401/2	[1.00]	Research in Neurosciences
NEUR*4450	[1.00]	Research in Neurosciences
PSYC*3240	[0.50]	Independent Research Project **
PSYC*4240	[0.50]	Advanced Independent Research Project **
PSYC*4870	[0.50]	Honours Thesis I **
PSYC*4880	[1.00]	Honours Thesis II **

5. A minimum of 0.50 credits of additional statistics or experimental design

PSYC*2360	[0.50]	Psychological Methods and Statistics
STAT*2050	[0.50]	Statistics II

#### Lists of recommended electives

The following lists contain recommended electives for students wishing to emphasize particular areas in neuroscience.

\*Indicates courses that require additional prerequisites.

#### Psychology

PSYC*2330	[0.50]	Principles of Learning
PSYC*2390	[0.50]	Sensation and Perception
PSYC*2650	[0.50]	Cognitive Psychology
PSYC*3030	[0.50]	Neurochemical Basis of Behaviour *
PSYC*3100	[0.50]	Evolutionary Psychology *
PSYC*3330	[0.50]	Memory and Attention *
PSYC*3410	[0.50]	Behavioural Neuroscience II
PSYC*4470	[0.50]	Advanced Topics in Behavioural and Cognitive Neuroscience
PSYC*4750	[0.50]	Seminar in Motivation and Emotion

#### Computation, Modeling and Statistics

CIS*1500	[0.50]	Introduction to Programming
CIS*2500	[0.50]	Intermediate Programming *
MATH*1160	[0.50]	Linear Algebra I
MATH*2080	[0.50]	Elements of Calculus II
MATH*2270	[0.50]	Applied Differential Equations *
MATH*3510	[0.50]	Biostatistics *
PSYC*3250	[0.50]	Psychological Measurement *
PSYC*3290	[0.50]	Conducting Statistical Analyses in Psychology *
STAT*3240	[0.50]	Applied Regression Analysis *

#### Biological Science

BIOC*3560	[0.50]	Structure and Function in Biochemistry
BIOC*4580	[0.50]	Membrane Biochemistry *
BIOM*4070	[0.50]	Biomedical Histology *
MBG*3050	[0.50]	Human Genetics
MCB*3010	[0.50]	Dynamics of Cell Function and Signaling
MCB*4010	[0.50]	Advanced Cell Biology
ZOO*3000	[0.50]	Comparative Histology

#### Health & Disease

BIOM*3040	[0.75]	Medical Embryology *
BIOM*4030	[0.50]	Endocrine Physiology *
BIOM*4050	[0.50]	Biomedical Aspects of Aging *
HK*3100	[0.50]	Neuromuscular Physiology *
HK*3810	[0.75]	Human Physiology II - Integrated Systems *
HK*4070	[0.50]	Clinical Biomechanics *
TOX*4000	[0.50]	Medical Toxicology *

#### Credit Summary (20.00 Total Credits)

4.00 – First year science core

7.00 – Required science courses semester 3-8

3.00 – Restricted elective (#1,2,3,4,5 in restricted electives list)

2.00 – Approved Science elective\*

0.50 - Required arts and social science elective (PSYC\*1000)

1.00 – Arts and/or Social Science electives

2.50 – Free electives

Of the 20 total credits required, students must complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

\*2.50 Approved Science Electives if a PHIL\*XXXX course is selected for restricted electives #1

#### Minor (Honours Program)

A minor in Neuroscience requires a minimum of 5.00 credits including:

NEUR*2000	[0.50]	Introduction to Neuroscience
NEUR*3100	[0.50]	Molecular Biology of Neurodevelopmental and Degenerative Disease
PSYC*1000	[0.50]	Introduction to Psychology
PSYC*2330	[0.50]	Principles of Learning

0.50 credits from:

PSYC*1010	[0.50]	Making Sense of Data in Psychological Research
STAT*2040	[0.50]	Statistics I

A minimum of 0.50 credits from:

BIOM*2000	[0.50]	Concepts in Human Physiology
BIOM*3200	[1.00]	Biomedical Physiology
HK*2810	[0.50]	Human Physiology I - Concepts and Principles
ZOO*3600	[0.50]	Comparative Animal Physiology I

A minimum of 2.00 credits from:

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
BIOM*3000	[0.50]	Functional Mammalian Neuroanatomy
BIOM*3090	[0.50]	Principles of Pharmacology
BIOM*4030	[0.50]	Endocrine Physiology
HK*3100	[0.50]	Neuromuscular Physiology
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MBG*3050	[0.50]	Human Genetics
MCB*2050	[0.50]	Molecular Biology of the Cell
NEUR*4000	[0.50]	Current Issues in Neuroscience
NEUR*4100	[0.50]	Neuropharmacology
PHYS*2030	[0.50]	Biophysics of Excitable Cells
PHYS*2330	[0.50]	Electricity and Magnetism I
PSYC*2390	[0.50]	Sensation and Perception
PSYC*2650	[0.50]	Cognitive Psychology
PSYC*3030	[0.50]	Neurochemical Basis of Behaviour
PSYC*3270	[0.50]	Cognitive Neuroscience
PSYC*3330	[0.50]	Memory and Attention
PSYC*3410	[0.50]	Behavioural Neuroscience II
PSYC*4750	[0.50]	Seminar in Motivation and Emotion

Of the 2.00 additional credits, students may select one course from:

BIOM*3040	[0.75]	Medical Embryology
MBG*4040	[0.50]	Genetics and Molecular Biology of Development
ZOO*3050	[0.50]	Developmental Biology

Please note that some of the restricted electives require prerequisites that are not included in the minor.

## Nutritional and Nutraceutical Sciences (NANS)

### Department of Human Health and Nutritional Sciences, College of Biological Science

The Nutritional and Nutraceutical Sciences major is concerned with understanding the contribution of food, beverage and nutritional supplement consumption to growth, development of optimal biological function, maintenance of health, and treatment of disease.

If lacking the fundamentals of word processing, spread sheet use and data management, the student should select CIS\*1200 as early in the program as possible.

### Major (Honours Program)

Students may enter this major in Semester I or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. A total of 20.00 credits is required.

#### Semester 1

BIOL*1080	[0.50]	Biological Concepts of Health
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/revisedss>

#### Semester 2

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

0.50 arts or social science electives

#### Semester 3

BIOC*2580	[0.50]	Introduction to Biochemistry
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
STAT*2040	[0.50]	Statistics I

0.50 electives or restricted electives

0.50 arts or social science electives

#### Semester 4

BIOC*3560	[0.50]	Structure and Function in Biochemistry
HK*2810	[0.50]	Human Physiology I - Concepts and Principles
MCB*2050	[0.50]	Molecular Biology of the Cell
NUTR*3210	[0.50]	Fundamentals of Nutrition

0.50 arts or social science electives

#### Semester 5

HK*3810	[0.75]	Human Physiology II - Integrated Systems
NUTR*3330	[0.50]	Micronutrients, Phytochemicals and Health

NUTR*3360	[0.50]	Lifestyle Genomics
NUTR*3390	[0.75]	Applied Nutritional and Nutraceutical Sciences I

#### Semester 6

BIOM*3090	[0.50]	Principles of Pharmacology
NUTR*4090	[0.50]	Functional Foods and Nutraceuticals
NUTR*4320	[0.50]	Nutrition and Metabolic Control of Disease
NUTR*4330	[0.75]	Applied Nutritional and Nutraceutical Sciences II

Electives or restricted electives to a maximum of 2.75 total credits in this semester.

#### Semester 7

NUTR*4210	[0.50]	Nutrition, Exercise and Energy Metabolism
NUTR*4510	[0.50]	Toxicology, Nutrition and Food

1.50 electives or restricted electives

#### Semester 8

2.50 electives or restricted electives

#### Restricted Electives

- 2.00 credits of Approved Arts and Social Science electives
- 1.00 credits from the following:

HK*4230	[0.50]	Advanced Study in Human Health and Nutritional Sciences
HK*4340	[0.50]	Genomics: Exercise and Disease
HK*4360	[1.00]	Research in Human Health and Nutritional Sciences
HK*4371/2	[1.00]	Research in Human Health and Nutritional Sciences II
HK*4510	[1.00]	Teaching, Learning & Knowledge Transfer
HK*4511/2	[1.00]	Teaching, Learning & Knowledge Transfer II
HK*4460	[0.50]	Regulation of Human Metabolism
NUTR*4360	[0.50]	Current Issues in Nutrigenomics
PATH*3610	[0.50]	Principles of Disease

#### Credit Summary (20.00 Total Credits)

4.00 - First year science core

9.25 - Required science courses semesters 3 - 8

1.00 - Restricted electives (#2 in restricted electives list)

1.75 - Approved science electives

2.00 - Approved Arts and/or Social Science electives (#1 in restricted electives list)

2.00 - Free electives - any approved electives for B.Sc. students.

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

### Minor (Honours Program)

A minor in Nutritional and Nutraceutical Sciences (NANS) requires 5.00 credits as follows:

BIOC*2580	[0.50]	Introduction to Biochemistry
NUTR*3210	[0.50]	Fundamentals of Nutrition
NUTR*3330	[0.50]	Micronutrients, Phytochemicals and Health
NUTR*4090	[0.50]	Functional Foods and Nutraceuticals
STAT*2040	[0.50]	Statistics I

At least 0.50 credits from:

ANSC*3080	[0.50]	Agricultural Animal Physiology (restricted to ABIO majors)
BIOM*3200	[1.00]	Biomedical Physiology
HK*2810	[0.50]	Human Physiology I - Concepts and Principles
ZOO*3600	[0.50]	Comparative Animal Physiology I

and 2.00 credits from:

ANSC*3170	[0.50]	Nutrition of Fish and Crustacea
ANSC*3180	[0.50]	Wildlife Nutrition
ANSC*4260	[0.50]	Beef Cattle Nutrition
ANSC*4270	[0.50]	Dairy Cattle Nutrition
ANSC*4280	[0.50]	Poultry Nutrition
ANSC*4290	[0.50]	Swine Nutrition
ANSC*4560	[0.50]	Pet Nutrition
EQN*4020	[0.50]	Advanced Equine Nutrition
FOOD*2010	[0.50]	Principles of Food Science
HK*3810	[0.75]	Human Physiology II - Integrated Systems
HK*4230	[0.50]	Advanced Study in Human Health and Nutritional Sciences
HK*4340	[0.50]	Genomics: Exercise and Disease
HK*4360	[1.00]	Research in Human Health and Nutritional Sciences
HK*4371/2	[1.00]	Research in Human Health and Nutritional Sciences II
HK*4510	[1.00]	Teaching, Learning & Knowledge Transfer
HK*4511/2	[1.00]	Teaching, Learning & Knowledge Transfer II
NUTR*2150	[0.50]	Introduction to Nutritional and Food Sciences
NUTR*3360	[0.50]	Lifestyle Genomics
NUTR*3390	[0.75]	Applied Nutritional and Nutraceutical Sciences I
NUTR*4210	[0.50]	Nutrition, Exercise and Energy Metabolism
NUTR*4320	[0.50]	Nutrition and Metabolic Control of Disease
NUTR*4330	[0.75]	Applied Nutritional and Nutraceutical Sciences II

NUTR*4360	[0.50]	Current Issues in Nutrigenomics
NUTR*4510	[0.50]	Toxicology, Nutrition and Food

## Physical Science (PSCI)

### College of Physical and Engineering Science

#### Major (Honours Program)

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. This major will require the completion of 20.00 credits as indicated below:

##### 1. Basic Science Core - 4.00 credits

- 1.00 - Biology (BIOL\*1070, BIOL\*1080, BIOL\*1090)
- 1.00 - Chemistry (CHEM\*1040, CHEM\*1050)\*
- 1.00 - Physics [ PHYS\*1080, (1 of PHYS\*1010, PHYS\*1070, PHYS\*1130)]\*
- 1.00 - Mathematical Science [(MATH\*1080, MATH\*2080) or (MATH\*1200, MATH\*1210)]
- \* IPS\*1500 can be taken instead of PHYS\*1080 and MATH\*1200, and IPS\*1510 can be taken instead of PHYS\*1010 and MATH\*1210.

##### 2. Subject Area Core - 8.00 credits

- 0.50 STAT\*2040
- 0.50 (CIS\*1200 or CIS\*1500 )
- 7.00 physical science credits, including at least 4.00 credits at the 3000 or 4000 level of which 2.00 credits must be at the 4000 level.

##### 3. Science Electives - 4.00 credits

- 4.00 science credits from the List of Approved Science Electives for B.Sc. Students\*

##### 4. Arts and Social Science Electives - 2.00

- 2.00 acceptable Arts or Social Science credits selected from the List of Approved B.Sc. Electives\*

##### 5. Free Electives - 2.00 credits

**Note:** the program must include a total of 6.00 science credits at the 3000 or 4000 level. Of these, at least 2.00 credits must be physical science at the 4000 level.

#### Semester 1

CHEM*1040	[0.50]	General Chemistry I
PHYS*1080	[0.50]	Physics for Life Sciences

One of:

MATH*1080	[0.50]	Elements of Calculus I
MATH*1200	[0.50]	Calculus I

\* IPS\*1500 can be taken instead of PHYS\*1080 and MATH\*1200.

One of

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

#### Semester 2

CHEM*1050	[0.50]	General Chemistry II
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One of:

PHYS*1010	[0.50]	Introductory Electricity and Magnetism
PHYS*1080	[0.50]	Physics for Life Sciences
PHYS*1130	[0.50]	Physics with Applications

One of:

MATH*1210	[0.50]	Calculus II
MATH*2080	[0.50]	Elements of Calculus II

IPS\*1510 can be taken instead of PHYS\*1010 and MATH\*1210.

One of

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

0.50 Arts or Social Science electives

#### Semester 3

1.50 science electives from the approved list of acceptable B.Sc. science electives\*  
0.50 electives

One of:

CIS*1200	[0.50]	Introduction to Computing
CIS*1500	[0.50]	Introduction to Programming

OR

STAT*2040	[0.50]	Statistics I
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#### Semester 4

1.50 science electives from the approved list of B.Sc. science electives\*

0.50 electives

One of:

CIS*1200	[0.50]	Introduction to Computing
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CIS*1500	[0.50]	Introduction to Programming (if a statistics course is chosen in Semester 3)
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OR

STAT*2040	[0.50]	Statistics I (if a computing course is chosen in Semester 3)
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#### Semester 5 to 8

Total of 2.50 credits per semester including at least 2.00 science electives.

Sufficient courses at the 3000 or 4000 level must be selected in Semesters 5 through 8 to total 6.00 credits in science at the 3000 or 4000 level with at least 2.00 physical science at the 4000 level.

\*approved course lists are available in the B.Sc. Academic Counselling Office or at: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml](http://www.bsc.uoguelph.ca/Approved_electives.shtml)

#### Credit Summary (20.00 Total Credits)

4.00 - First year science credits

8.00 - Subject area core semesters 3 – 8 (including STAT 2040 and CIS 1200 or CIS 1500)

4.00 - Approved Science electives

2.00 - Arts and/or Social Science electives (# 1 in restricted elective list)

2.00 - Free electives - any approved elective for B.Sc. students. (could be less if restricted electives do not count as science)

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

#### Honours Physical Science (With a Minor)

The requirements and schedules are the same as for Honours Physical Science. Available Minor subjects are listed at the beginning of the B.Sc. Program section under the heading Honours Program Minors.

#### Physics (PHYS)

##### Department of Physics, College of Physical and Engineering Science

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. Since some of the required courses are not offered every semester, students entering the Major in Honours Physics should plan their program in consultation with the Department of Physics Faculty Advisor.

#### Major (Honours Program)

This major requires the completion of 20.00 credits. At least 1.00 credits must be from Arts and/or Social Science courses.

##### Semester 1\*

CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I
MATH*1160	[0.50]	Linear Algebra I

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

Students who are lacking one 4U/grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

##### Semester 2\*

CHEM*1050	[0.50]	General Chemistry II
CIS*1500	[0.50]	Introduction to Programming
IPS*1510	[1.00]	Integrated Mathematics and Physics II

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

\* students who have taken physics courses other than IPS\*1500 or PHYS\*1080 in Semester 1 and IPS\*1510 or PHYS\*1010 in Semester 2, may proceed to semester 3 with the permission of the Department of Physics

##### Semester 3

MATH*2200	[0.50]	Advanced Calculus I
MATH*2270	[0.50]	Applied Differential Equations
PHYS*2240	[0.50]	Thermal Physics
PHYS*2330	[0.50]	Electricity and Magnetism I

0.50 Arts or Social Science electives

##### Semester 4

PHYS*2180	[0.50]	Experimental Techniques in Physics
PHYS*2310	[0.50]	Mechanics
PHYS*2340	[0.50]	Electricity and Magnetism II

1.00 electives



<b>Semester 5</b>			PHYS*1010	[0.50]	Introductory Electricity and Magnetism
NANO*3600	[0.50]	Computational Methods in Materials Science	PHYS*1070	[0.50]	Physics for Life Sciences II
PHYS*3130	[0.50]	Mathematical Physics	PHYS*1080	[0.50]	Physics for Life Sciences
PHYS*3230	[0.50]	Quantum Mechanics I	PHYS*1130	[0.50]	Physics with Applications
PHYS*3400	[0.50]	Advanced Mechanics	IPS*1510	[1.00]	Integrated Mathematics and Physics II
0.50 electives			A minimum of 1.00 credits are required at the 3000 or 4000 level.		

**NOTE:** PHYS\*1300, PHYS\*1600 and PHYS\*1810 may not be taken for credit toward this minor.

### Physics (Co-op) (PHYS:C)

#### Department of Physics, College of Physical and Engineering Science

Since some of the required courses are not offered every semester, students entering the Major in Physics (Co-op) should plan their program in consultation with the Department of Physics Faculty Advisor. To graduate from the Co-op program, successfully completed work terms are required. Students are eligible to participate in a maximum two (2) work terms commencing in the summer and must follow the academic work schedule as outlined in the Co-operative Education & Career Services website: <https://www.recruituelph.ca/cccs/>.

### Major (Honours Program)

This major requires the completion of 20.00 credits.

#### Semester 1 - Fall

CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I
MATH*1160	[0.50]	Linear Algebra I

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

Students who are lacking one 4U/grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/revisedss>

#### Semester 2 - Winter

CHEM*1050	[0.50]	General Chemistry II
CIS*1500	[0.50]	Introduction to Programming
IPS*1510	[1.00]	Integrated Mathematics and Physics II

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

#### Semester 3 - Fall

COOP*1100	[0.00]	Introduction to Co-operative Education
MATH*2200	[0.50]	Advanced Calculus I
MATH*2270	[0.50]	Applied Differential Equations
PHYS*2240	[0.50]	Thermal Physics
PHYS*2330	[0.50]	Electricity and Magnetism I

0.50 Arts or Social Science electives\*

#### Semester 4 - Winter

PHYS*2180	[0.50]	Experimental Techniques in Physics
PHYS*2310	[0.50]	Mechanics
PHYS*2340	[0.50]	Electricity and Magnetism II

One of:

CIS*2500	[0.50]	Intermediate Programming
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0.50 electives

0.50 electives

#### Summer Semester

COOP*1000	[0.00]	Co-op Work Term I ++
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#### Semester 5 - Fall

NANO*3600	[0.50]	Computational Methods in Materials Science
PHYS*3130	[0.50]	Mathematical Physics
PHYS*3230	[0.50]	Quantum Mechanics I
PHYS*3400	[0.50]	Advanced Mechanics

0.50 electives

#### Winter Semester

COOP*2000	[0.00]	Co-op Work Term II ++ (8-month work term in conjunction with COOP*3000)
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#### Summer Semester

COOP*3000	[0.00]	Co-op Work Term III ++ (8-month work term in conjunction with COOP*2000)
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#### Semester 6 - Fall +

PHYS*4180	[0.50]	Advanced Electromagnetic Theory
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One of:

CIS*2520	[0.50]	Data Structures
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0.50 electives\*\*

PHYS*3000	[0.50]	Optics: Fundamentals and Applications
PHYS*3510	[0.50]	Intermediate Laboratory
PHYS*4040	[0.50]	Quantum Mechanics II
PHYS*4300	[0.50]	Inquiry in Physics

One of:

MATH*3260	[0.50]	Complex Analysis
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0.50 electives

#### Semester 7+

PHYS*4500	[0.50]	Advanced Physics Laboratory
PHYS*4180	[0.50]	Advanced Electromagnetic Theory

One of:

PHYS*4240	[0.50]	Statistical Physics II
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0.50 electives

One of:

PHYS*4001	[0.50]	Research in Physics
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0.50 electives

0.50 electives \*\*

#### Semester 8+

One of:

PHYS*4002	[0.50]	Research in Physics
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0.50 electives\*\*

2.00 electives \*\*

+ students going on to graduate school in physics should take PHYS\*4001/2, PHYS\*4120, PHYS\*4130, PHYS\*4150, PHYS\*4240

\*\* At least 1.50 credits must be from lists A and B below. At least 1.00 credits must be from list A. Substitutions of courses in list B by other 3000 or 4000 level courses must be approved by the Physics Faculty Advisor.

#### List A

PHYS*4120	[0.50]	Atomic and Molecular Physics
PHYS*4130	[0.50]	Subatomic Physics
PHYS*4150	[0.50]	Solid State Physics

#### List B

EDRD*3120	[0.50]	Educational Communication
ENVS*3060	[0.50]	Groundwater
GEOG*3420	[0.50]	Remote Sensing of the Environment
MATH*3200	[0.50]	Real Analysis
PHYS*3170	[0.50]	Radioactivity and Radiation Interactions
PHYS*4070	[0.50]	Clinical Applications of Physics in Medicine
PHYS*4540	[0.50]	Molecular Biophysics
PHYS*4910	[0.50]	Advanced Topics in Physics I
PHYS*4920	[0.50]	Advanced Topics in Physics II
PHYS*4930	[0.50]	Advanced Topics in Physics III
POLS*3370	[0.50]	Environmental Politics and Governance
STAT*3240	[0.50]	Applied Regression Analysis
STAT*3510	[0.50]	Environmental Risk Assessment

#### Credit Summary (20.00 Total Credits)

4.50 - First year science credits

9.00 - Required science courses semesters 3 – 8

1.50 - Restricted electives (1.00 credits from List A and 0.50 credits from List B, some restricted electives from List B do not count as science electives towards degree therefore may need additional science electives)

1.00 or 1.50 - Approved Science electives (depending on restricted electives chosen)

1.00 - Arts and/or Social Science electives

2.50 - 3.00 - Free electives - any approved elective for B.Sc. students. , could be less if restricted electives do not count as science

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

#### Minor (Honours Program)

A minor in Physics requires 5.00 credits in interdisciplinary physical science or physics courses including:

PHYS*2180	[0.50]	Experimental Techniques in Physics
PHYS*2310	[0.50]	Mechanics
PHYS*2330	[0.50]	Electricity and Magnetism I
PHYS*2340	[0.50]	Electricity and Magnetism II

A maximum of 1.00 credits from the following courses may be used towards the minor:

One of:  
 PHYS\*4240 [0.50] Statistical Physics II  
 0.50 electives\*\*  
 1.00 electives \*\*

**Semester 7 - Winter +**

PHYS\*3000 [0.50] Optics: Fundamentals and Applications  
 PHYS\*3510 [0.50] Intermediate Laboratory  
 PHYS\*4040 [0.50] Quantum Mechanics II  
 PHYS\*4300 [0.50] Inquiry in Physics

One of:  
 MATH\*3260 [0.50] Complex Analysis  
 0.50 electives\*\*

**Summer Semester**

COOP\*4000 [0.00] Co-op Work Term IV ++

**Fall Semester**

COOP\*5000 [0.00] Co-op Work Term V ++

**Semester 8 - Winter +**

PHYS\*4500 [0.50] Advanced Physics Laboratory

One of:  
 PHYS\*4130 [0.50] Subatomic Physics  
 0.50 electives\*\*

One of:  
 PHYS\*4150 [0.50] Solid State Physics  
 0.50 electives\*\*

1.00 electives\*\*

\* 1.00 credits must be taken as Arts or Social Science electives in this Major

+ students going on to graduate school in physics should take PHYS\*4130, PHYS\*4150, and PHYS\*4240

\*\*At least 1.50 credits must be from lists A and B below. At least 1.00 credits must be from list A. Substitutions of courses in list B by other 3000 or 4000 level courses must be approved by the Physics Faculty Advisor.

++Four work terms are required for the completion of the co-op degree. It is also necessary that there be at least one work term in each of Fall, Winter and Summer semesters. Therefore, one of the summer work terms could be missed and the student would still graduate successfully. Whether the student completes four or five work terms, a report is required for each work term completed. Contact the co-op faculty advisor for further details.

**List A**

PHYS\*4130 [0.50] Subatomic Physics  
 PHYS\*4150 [0.50] Solid State Physics  
 PHYS\*4240 [0.50] Statistical Physics II

**List B**

EDRD\*3120 [0.50] Educational Communication  
 ENVS\*3060 [0.50] Groundwater  
 GEOG\*3420 [0.50] Remote Sensing of the Environment  
 MATH\*3200 [0.50] Real Analysis  
 PHYS\*3170 [0.50] Radioactivity and Radiation Interactions  
 PHYS\*4070 [0.50] Clinical Applications of Physics in Medicine  
 PHYS\*4540 [0.50] Molecular Biophysics  
 PHYS\*4910 [0.50] Advanced Topics in Physics I  
 PHYS\*4920 [0.50] Advanced Topics in Physics II  
 PHYS\*4930 [0.50] Advanced Topics in Physics III  
 POLS\*3370 [0.50] Environmental Politics and Governance  
 STAT\*3240 [0.50] Applied Regression Analysis  
 STAT\*3510 [0.50] Environmental Risk Assessment

**Credit Summary (20.00 Total Credits)**

4.50 - First year science credits

9.00 - Required science courses semesters 3 – 8

1.50 - Restricted electives (1.00 credits from List A and 0.50 credits from List B, some restricted electives from List B do not count as science electives towards degree therefore may need additional science electives)

1.00 or 1.50 - Approved Science electives (depending on restricted electives chosen)

1.00 - Arts and/or Social Science electives

2.50 - 3.00 - Free electives - any approved elective for B.Sc. students. , could be less if restricted electives do not count as science

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Plant Science (PLSC)**

**Department of Plant Agriculture, Ontario Agricultural College**  
**School of Environmental Sciences, Ontario Agricultural College**  
**Department of Integrative Biology, College of Biological Science**

**Department of Molecular and Cellular Biology, College of Biological Science****Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. The major requires the completion of 20.00 credits.

**Semester 1**

BIOL\*1070 [0.50] Discovering Biodiversity  
 CHEM\*1040 [0.50] General Chemistry I  
 MATH\*1080 [0.50] Elements of Calculus I  
 PHYS\*1080 [0.50] Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at: <http://www.bsc.uoguelph.ca/revisedss>

**Semester 2**

BIOL\*1090 [0.50] Introduction to Molecular and Cellular Biology  
 CHEM\*1050 [0.50] General Chemistry II  
 PHYS\*1070 [0.50] Physics for Life Sciences II

One of:

CIS\*1200 [0.50] Introduction to Computing  
 CIS\*1500 [0.50] Introduction to Programming  
 MATH\*2080 [0.50] Elements of Calculus II

0.50 Arts or Social Science electives

**Semester 3**

AGR\*2470 [0.50] Introduction to Plant Agriculture  
 BIOC\*2580 [0.50] Introduction to Biochemistry  
 BOT\*2100 [0.50] Life Strategies of Plants  
 MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics

0.50 Arts and Social Science electives

**Semester 4**

MCB\*2050 [0.50] Molecular Biology of the Cell  
 STAT\*2040 [0.50] Statistics I

One of:

AGR\*2050 [0.50] Agroecology  
 BIOL\*2060 [0.50] Ecology

1.00 electives or restricted electives

**Semester 5**

BOT\*3410 [0.50] Plant Anatomy

2.00 electives or restricted electives

**Semester 6**

BOT\*3310 [0.50] Plant Growth and Development  
 BOT\*3710 [0.50] Plant Diversity and Evolution

1.50 electives or restricted electives

**Semester 7**

2.50 electives or restricted electives

**Semester 8**

BOT\*4380 [0.50] Metabolism in the Whole Life of Plants

2.00 electives or restricted electives

**Program Requirements**

1. Students must declare an area of emphasis in one of the 4 following areas: Applied Plant Science, Botany, Plant Biotechnology, Plant Environmental Science or Unspecialized.
2. Students must complete at least 5.00 credits from within their area of emphasis

**Restricted Electives**

1. A minimum of 1.50 credits of Arts and Social Science electives
2. 5.00 credits from within their area of emphasis from the lists below

**Note:** Restricted electives indicated with † are non-science electives. If non-science restricted electives are chosen students are reminded that they will still be responsible for meeting the minimum requirement of 16.00 credits in science and that the credit summary may vary from what is specified below.

If non-science restricted electives are chosen, students are reminded that they will still be responsible for meeting the minimum of 16.00 credits in science and that the credit summary may vary from what is specified below

**Note:** Restricted electives indicated with \*\* require other restricted electives as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

‡Students interested in graduate studies are encouraged to take two semesters of research projects which will count towards restricted elective requirements in an area of emphasis:

AGR\*4450 [1.00] Research Project I  
 AGR\*4460 [1.00] Research Project II  
 or  
 IBIO\*4500 [0.75] Research in Integrative Biology I

IBIO*4510	[0.75]	Research in Integrative Biology II
or		
MCB*4500	[1.00]	Research Project in Molecular & Cellular Biology I
MCB*4510	[1.00]	Research Project in Molecular & Cellular Biology

**Credit Summary (20.00 Total Credits)**

4.00 - First year science core

5.50 - Required science courses semesters 3 - 8

5.00 - Restricted electives for the declared area of emphasis (#2)

1.50 - Approved science electives, if all restricted electives chosen are approved science electives.

1.50 - Arts and/or Social Science electives

2.50 - Free electives - any approved elective for B.Sc. Students (may be less if restricted electives do not count as science)

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Area of Emphasis****Applied Plant Science (APSC)**

CROP*4240	[0.50]	Weed Science
ENVS*2060	[0.50]	Soil Science
ENVS*3210	[0.50]	Plant Pathology
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests **

‡ 3.00 credits from:

AGR*3450	[0.50]	Research Methods in Agricultural Science
CROP*3300	[0.50]	Grain Crops
CROP*3310	[0.50]	Protein and Oilseed Crops
CROP*3340	[0.50]	Managed Grasslands
CROP*4220	[0.50]	Cropping Systems **
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management
ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3080	[0.50]	Soil and Water Conservation **
ENVS*3140	[0.50]	Management of Turfgrass Diseases **
ENVS*3310	[0.50]	Soil Biodiversity and Ecosystem Function **
ENVS*4090	[0.50]	Soil Management
HORT*2450	[0.50]	Introduction to Turfgrass Science
HORT*3010	[0.50]	Annual, Perennial and Indoor Plants - Identification and Use
HORT*3050	[0.50]	Management of Turfgrass Insect Pests and Weeds **
HORT*3150	[0.50]	Principles and Applications of Plant Propagation
HORT*3270	[0.50]	Medicinal Plants
HORT*3280	[0.50]	Greenhouse Production
HORT*3430	[0.50]	Wine-Grape Culture
HORT*3510	[0.50]	Vegetable Production
HORT*4200	[0.50]	Plants, the Environment and Society **
HORT*4300	[0.50]	Postharvest Physiology
HORT*4420	[0.50]	Fruit Crops
HORT*4450	[0.50]	Advanced Turfgrass Science **
LARC*2240	[0.50]	Plants in the Landscape
MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics
MBG*3100	[0.50]	Plant Genetics
MBG*4160	[0.50]	Plant Breeding
OAGR*2070	[1.00]	Introduction to Organic Agriculture
OAGR*4050	[1.00]	Design of Organic Production Systems
PBIO*3110	[0.50]	Crop Physiology
PBIO*3750	[0.50]	Plant Tissue Culture
PBIO*4750	[0.50]	Genetic Engineering of Plants
STAT*2050	[0.50]	Statistics II
STAT*3210	[0.50]	Experimental Design

**Botany (BOT)**

BOT*3050	[0.50]	Plant Functional Ecology
MBG*3100	[0.50]	Plant Genetics
PBIO*4000	[0.50]	Molecular and Cellular Aspects of Plant-Microbe Interactions
PBIO*4150	[0.50]	Molecular and Cellular Aspects of Plant Development

‡ 3.00 credits from:

AGR*3450	[0.50]	Research Methods in Agricultural Science
MBG*4300	[0.50]	Plant Molecular Genetics
MICR*2420	[0.50]	Introduction to Microbiology
MICR*3090	[0.50]	Mycology
MICR*3220	[0.50]	Plant Microbiology
PBIO*3110	[0.50]	Crop Physiology
PBIO*3750	[0.50]	Plant Tissue Culture

PBIO*4750	[0.50]	Genetic Engineering of Plants
STAT*2050	[0.50]	Statistics II
STAT*3210	[0.50]	Experimental Design **

**Plant Biotechnology (PBTC)**

MBG*3100	[0.50]	Plant Genetics
MBG*3350	[0.75]	Laboratory Methods in Molecular Biology I
PBIO*3750	[0.50]	Plant Tissue Culture
PBIO*4750	[0.50]	Genetic Engineering of Plants

‡ minimum of 2.75 credits from:

AGR*3450	[0.50]	Research Methods in Agricultural Science
BIOL*3300	[0.50]	Applied Bioinformatics
MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics
MBG*3660	[0.50]	Genomics
MBG*4160	[0.50]	Plant Breeding
MBG*4300	[0.50]	Plant Molecular Genetics
MCB*4010	[0.50]	Advanced Cell Biology
MICR*2420	[0.50]	Introduction to Microbiology
MICR*3220	[0.50]	Plant Microbiology
MICR*3230	[0.50]	Immunology
MICR*3330	[0.50]	World of Viruses
PBIO*3110	[0.50]	Crop Physiology
PBIO*4150	[0.50]	Molecular and Cellular Aspects of Plant Development
STAT*2050	[0.50]	Statistics II
STAT*3210	[0.50]	Experimental Design **

**Plant Environmental Science (PESC)**

BOT*3050	[0.50]	Plant Functional Ecology
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*4350	[0.50]	Forest Ecology
GEOG*2480	[0.50]	Mapping and GIS

‡ 3.00 credits from:

AGR*3450	[0.50]	Research Methods in Agricultural Science
BIOL*3010	[0.50]	Laboratory and Field Work in Ecology
BIOL*3060	[0.50]	Populations, Communities & Ecosystems
BIOL*3130	[0.50]	Conservation Biology
BIOL*4500	[0.50]	Natural Resource Policy Analysis
ENVS*2060	[0.50]	Soil Science
ENVS*2120	[0.50]	Introduction to Environmental Stewardship
ENVS*2330	[0.50]	Current Issues in Ecosystem Science and Biodiversity
ENVS*3000	[0.50]	Nature Interpretation
ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3040	[0.50]	Natural Chemicals in the Environment
ENVS*3090	[0.50]	Insect Diversity and Biology
ENVS*3210	[0.50]	Plant Pathology
ENVS*3250	[0.50]	Forest Health and Disease
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests **
GEOG*2210	[0.50]	Environment and Resources
GEOG*3210	[0.50]	Management of the Biophysical Environment **
GEOG*4210	[0.50]	Environmental Governance **
GEOG*4220	[0.50]	Local Environmental Management
LARC*3320	[0.50]	Principles of Landscape Ecology **
PHIL*2070	[0.50]	Philosophy of the Environment
POLS*3370	[0.50]	Environmental Politics and Governance
STAT*2050	[0.50]	Statistics II
STAT*3210	[0.50]	Experimental Design **

**Unspecialized (UNSP)**

Choose 5.00 credits from any courses listed in the other areas of emphasis.

**Minor (Honours Program)**

A minor in Plant Science requires a minimum of 5.00 credits in the Plant Science Program chosen in consultation with the Faculty Advisor. The courses include:

AGR*2470	[0.50]	Introduction to Plant Agriculture
BOT*2100	[0.50]	Life Strategies of Plants
BOT*3310	[0.50]	Plant Growth and Development
BOT*3410	[0.50]	Plant Anatomy
BOT*3710	[0.50]	Plant Diversity and Evolution
BOT*4380	[0.50]	Metabolism in the Whole Life of Plants

2.00 credits from any courses listed in the areas of emphasis.

Restricted electives indicated with \* are non-science electives. Restricted electives indicated with \*\* require other restricted electives as prerequisites.

**Statistics (STAT)****Department of Mathematics and Statistics, College of Physical and Engineering Science**

Statistics plays a fundamental role in virtually all scientific disciplines, including biology, physics, chemistry, medicine, epidemiology, kinesiology, and toxicology. Students minoring in Statistics will develop practical skills in data visualization and analysis, statistical computing, technical writing and communication in a variety of applications areas, preparing them well for careers in the modern workplace.

Students may declare this minor in any semester.

### Minor (Honours Program)

A total of 5.00 credits is required to complete the minor, including:

(MATH\*1080 or MATH\*1200)\*

(MATH\*1210 or MATH\*2080)\*\*

MATH*1160	[0.50]	Linear Algebra I
STAT*2040	[0.50]	Statistics I
STAT*2050	[0.50]	Statistics II
STAT*3100	[0.50]	Introductory Mathematical Statistics I
STAT*3110	[0.50]	Introductory Mathematical Statistics II
STAT*3240	[0.50]	Applied Regression Analysis

0.50 additional credits in Statistics

0.50 additional credits in Statistics or Mathematics at the 2000 level or above

\* IPS\*1500 can count toward this 0.50 credit

\*\* IPS\*1510 can count toward this 0.50 credit

**Note:** students may not count MATH\*1030 toward a minor in Statistics

### Theoretical Physics (THPY)

#### Department of Physics, College of Physical and Engineering Science

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. Since some of the required courses are not offered every semester, students entering the Major in Theoretical Physics should plan their program in consultation with the Faculty Advisor.

### Major (Honours Program)

This major requires the completion of 20.00 credits. At least 1.00 of these credits must be obtained from the completion of Arts and/or Social Science courses.

#### Semester 1

CHEM*1040	[0.50]	General Chemistry I
IPS*1500	[1.00]	Integrated Mathematics and Physics I
MATH*1160	[0.50]	Linear Algebra I

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

Students who are lacking one 4U/grade 12 course in Biology, Chemistry or Physics must take the equivalent introductory course in first semester. The required first-year science courses in that subject should be completed according to the revised schedule of studies available at: <http://www.bsc.uoguelph.ca/reviseds>

#### Semester 2

CHEM*1050	[0.50]	General Chemistry II
CIS*1500	[0.50]	Introduction to Programming
IPS*1510	[1.00]	Integrated Mathematics and Physics II

One of:

BIOL*1070	[0.50]	Discovering Biodiversity
BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology

**Note:** students who have taken physics courses other than IPS\*1500 or PHYS\*1080 in Semester 1 and IPS\*1510 or PHYS\*1010 in Semester 2, may proceed to semester 3 with the permission of the [Department of Physics](#)

#### Semester 3

MATH*2200	[0.50]	Advanced Calculus I
MATH*2270	[0.50]	Applied Differential Equations
PHYS*2240	[0.50]	Thermal Physics
PHYS*2330	[0.50]	Electricity and Magnetism I

0.50 Arts or Social Science electives

#### Semester 4

MATH*2210	[0.50]	Advanced Calculus II
PHYS*2180	[0.50]	Experimental Techniques in Physics
PHYS*2310	[0.50]	Mechanics
PHYS*2340	[0.50]	Electricity and Magnetism II

0.50 electives\*

#### Semester 5

NANO*3600	[0.50]	Computational Methods in Materials Science
PHYS*3130	[0.50]	Mathematical Physics
PHYS*3230	[0.50]	Quantum Mechanics I
PHYS*3400	[0.50]	Advanced Mechanics

0.50 electives\*

#### Semester 6

PHYS*3000	[0.50]	Optics: Fundamentals and Applications
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PHYS*3510	[0.50]	Intermediate Laboratory
PHYS*4040	[0.50]	Quantum Mechanics II
PHYS*4300	[0.50]	Inquiry in Physics

0.50 electives\*

#### Semester 7

PHYS*4120	[0.50]	Atomic and Molecular Physics
PHYS*4180	[0.50]	Advanced Electromagnetic Theory
PHYS*4240	[0.50]	Statistical Physics II

Two of:

PHYS*4001	[0.50]	Research in Physics
PHYS*4500	[0.50]	Advanced Physics Laboratory

0.50 electives\*

0.50 electives\*

#### Semester 8

MATH*3260	[0.50]	Complex Analysis
PHYS*4130	[0.50]	Subatomic Physics
PHYS*4150	[0.50]	Solid State Physics

One of:

PHYS*4002	[0.50]	Research in Physics
PHYS*4300	[0.50]	Inquiry in Physics

0.50 electives\*

0.50 electives\*

#### \*Restricted Electives

Students must complete 2.00 credits from the following list:

CIS*2500	[0.50]	Intermediate Programming
MATH*2130	[0.50]	Numerical Methods
MATH*3100	[0.50]	Differential Equations II
MATH*3130	[0.50]	Abstract Algebra
MATH*3160	[0.50]	Linear Algebra II
MATH*3200	[0.50]	Real Analysis
MATH*3240	[0.50]	Operations Research

#### Credit Summary (20.00 Total Credits)

4.50 - First year science credits

11.50 - Required science courses semesters 3 – 8

2.00 - Restricted electives

1.00 - Arts and/or Social Science electives

1.00 - Free electives - any approved elective for B.Sc. students. , could be less if restricted electives do not count as science

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

### Wildlife Biology and Conservation (WBC)

#### Department of Integrative Biology, College of Biological Science

The core of this major will provide students with an integrated foundation in three disciplines necessary to understand the origins, interactions, and protection of biological diversity: evolution, ecology, and conservation biology. After the second semester, the student has the opportunity to take a wide variety of electives, including courses that meet his/her specific interests within one or two of these disciplines. The program offers a sound scientific background in preparation for careers in resource management, conservation, ecological consulting, teaching, and government service. This major also qualifies students for post-graduate work in ecology, evolutionary biology, environmental sciences, or wildlife management.

### Major (Honours Program)

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. A minimum total of 20.00 credits is required to complete the major.

#### Semester 1

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I
PHYS*1080	[0.50]	Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/reviseds>

#### Semester 2

BIOL*1080	[0.50]	Biological Concepts of Health
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
PHYS*1070	[0.50]	Physics for Life Sciences II

0.50 Arts or Social Science electives

#### Semester 3

BIOC*2580	[0.50]	Introduction to Biochemistry
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MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics  
1.50 electives or restricted electives

**Semester 4**

BIOL\*2060 [0.50] Ecology  
BIOL\*2400 [0.50] Evolution  
STAT\*2230 [0.50] Biostatistics for Integrative Biology  
1.00 electives or restricted electives

**Semester 5**

BIOL\*3010 [0.50] Laboratory and Field Work in Ecology  
2.00 electives or restricted electives

**Semester 6**

BIOL\*3040 [0.50] Methods in Evolutionary Biology  
BIOL\*3060 [0.50] Populations, Communities & Ecosystems  
BIOL\*3130 [0.50] Conservation Biology  
1.00 electives or restricted electives

**Semester 7**

BIOL\*4110 [1.00] Ecological Methods  
BIOL\*4150 [0.50] Wildlife Conservation and Management  
1.00 electives or restricted electives

**Note:** For students considering graduate research programs, BIOL\*4110 may be substituted by an independent research course (1.00 credits minimum). Course options include: (IBIO\*4500 and IBIO\*4510), IBIO\*4521/IBIO\*4522.

**Semester 8**

BIOL\*4500 [0.50] Natural Resource Policy Analysis  
2.00 electives or restricted electives

**Restricted Electives**

Note that some courses have prerequisites, so be sure to consult the undergraduate calendar.

1. A minimum of 1.00 credits of Arts and/or Social Science electives are required. The list of approved Arts and Social Science electives for B.Sc. students is available at: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml#arts](http://www.bsc.uoguelph.ca/Approved_electives.shtml#arts)

2. A minimum of 0.50 credits from:

BOT\*2100 [0.50] Life Strategies of Plants  
ZOO\*2090 [0.50] Vertebrate Structure and Function  
ZOO\*2700 [0.50] Invertebrate Morphology & Evolution

3. A minimum of 0.50 credits from:

BOT\*3050 [0.50] Plant Functional Ecology  
ZOO\*3600 [0.50] Comparative Animal Physiology I

4. A minimum of 0.50 credits from:

BIOL\*3020 [0.50] Population Genetics  
BIOL\*4120 [0.50] Evolutionary Ecology

5. A minimum of 3.00 credits from any of the following lists of courses. The courses are broken into disciplines for which they are most suitable to help students tailor their electives towards a specific field if desired.

\*Some of the restricted electives will require additional courses outside of the required courses listed in Semesters 3-8

\*\* Please note not all restricted electives are considered science electives for B.Sc students. If the non-science restricted electives are chosen, students are reminded that they will still be responsible for meeting the minimum of 16.00 credits in science and that the credit summary may vary from what is specified below.

**Evolution**

BIOL\*3020 [0.50] Population Genetics  
BIOL\*3300 [0.50] Applied Bioinformatics  
BOT\*3710 [0.50] Plant Diversity and Evolution  
ENVS\*3090 [0.50] Insect Diversity and Biology  
ENVS\*3180 [0.50] Sedimentary Environments \*  
MBG\*3040 [0.50] Molecular Biology of the Gene  
MBG\*4110 [0.50] Epigenetics \*  
MBG\*4270 [0.50] DNA Replication, Recombination and Repair \*  
ZOO\*2700 [0.50] Invertebrate Morphology & Evolution  
ZOO\*3050 [0.50] Developmental Biology

**Ecology**

ANSC\*3180 [0.50] Wildlife Nutrition \*  
BIOL\*3450 [0.50] Introduction to Aquatic Environments  
ENVS\*3000 [0.50] Nature Interpretation  
ENVS\*3270 [0.50] Forest Biodiversity \*  
ENVS\*4350 [0.50] Forest Ecology \*  
NUTR\*3210 [0.50] Fundamentals of Nutrition  
ZOO\*4300 [0.75] Marine Biology and Oceanography \*  
ZOO\*4570 [0.50] Marine Ecological Processes \*

**Conservation**

BIOL\*4350 [0.50] Limnology of Natural and Polluted Waters \*  
ECON\*1050 [0.50] Introductory Microeconomics  
ECON\*2100 [0.50] Economic Growth and Environmental Quality \*\*  
ENVS\*2030 [0.50] Meteorology and Climatology

ENVS\*3010 [0.50] Climate Change Biology  
FARE\*2700 [0.50] Survey of Natural Resource Economics \*\*  
GEOG\*1220 [0.50] Human Impact on the Environment \*\*  
GEOG\*2480 [0.50] Mapping and GIS  
GEOG\*3480 [0.50] GIS and Spatial Analysis  
GEOG\*4230 [0.50] Environmental Impact Assessment \*  
GEOG\*4480 [1.00] Applied Geomatics

**Integrative/Cross-Disciplinary**

IBIO\*4500 [0.75] Research in Integrative Biology I  
IBIO\*4510 [0.75] Research in Integrative Biology II  
IBIO\*4521/2 [2.00] Thesis in Integrative Biology  
MCB\*2050 [0.50] Molecular Biology of the Cell  
ZOO\*3610 [0.25] Lab Studies in Animal Physiology I  
ZOO\*3620 [0.50] Comparative Animal Physiology II  
ZOO\*3630 [0.25] Lab Studies in Animal Physiology II  
ZOO\*3700 [0.50] Integrative Biology of Invertebrates \*  
ZOO\*4070 [0.50] Animal Behaviour  
ZOO\*4910 [0.50] Integrative Vertebrate Biology \*  
ZOO\*4920 [0.25] Lab Studies in Ornithology  
ZOO\*4940 [0.25] Lab Studies in Herpetology  
ZOO\*4950 [0.25] Lab Studies in Mammalogy

**Field Courses**

BIOL\*4410 [0.75] Field Ecology  
BIOL\*4610 [0.75] Arctic Ecology  
BIOL\*4700 [0.50] Field Biology  
BIOL\*4710 [0.25] Field Biology  
BIOL\*4800 [0.50] Field Biology  
BIOL\*4810 [0.25] Field Biology  
BIOL\*4900 [0.50] Field Biology

**Credit Summary (20.00 Total Credits)**

4.00 - First year science core

6.50 - Required science courses semesters 3 - 8

4.50 - Restricted electives (#2,3 and 4 in restricted electives list)\*\*

1.00 - Approved Science electives

1.00 - Approved Arts and/or Social Science electives (#1 in restricted electives list)

3.00 - Free electives - any approved elective for B.Sc. students

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

**Zoology (ZOO)****Department of Integrative Biology, College of Biological Science**

The Major in Zoology offers a broad education in the life sciences while providing a more specialized understanding of the structure, function and ecology of animals. This major qualifies students for post-graduate work in zoology and other life sciences and provides a sound science background for students wishing to pursue careers in teaching, government service or the private sector.

**Major (Honours Program)**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. A minimum total of 20.00 credits is required to complete the major. At least 6.00 science credits must be at the 3000 or 4000 level, 2.00 of which must be at the 4000 level.

**Semester 1**

BIOL\*1070 [0.50] Discovering Biodiversity  
CHEM\*1040 [0.50] General Chemistry I  
MATH\*1080 [0.50] Elements of Calculus I  
PHYS\*1080 [0.50] Physics for Life Sciences

0.50 Arts or Social Science electives

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at <http://www.bsc.uoguelph.ca/reviseds>

**Semester 2**

BIOL\*1080 [0.50] Biological Concepts of Health  
BIOL\*1090 [0.50] Introduction to Molecular and Cellular Biology  
CHEM\*1050 [0.50] General Chemistry II  
PHYS\*1070 [0.50] Physics for Life Sciences II

0.50 Arts or Social Science electives

**Semester 3**

BIOL\*2060 [0.50] Ecology  
BIOL\*2400 [0.50] Evolution  
ZOO\*2090 [0.50] Vertebrate Structure and Function

1.00 electives or restricted electives \*

**Semester 4**

BIOC\*2580 [0.50] Introduction to Biochemistry

MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
STAT*2230	[0.50]	Biostatistics for Integrative Biology
ZOO*2700	[0.50]	Invertebrate Morphology & Evolution

0.50 electives or restricted electives \*

#### Semester 5

ZOO*3000	[0.50]	Comparative Histology
ZOO*3600	[0.50]	Comparative Animal Physiology I
ZOO*3610	[0.25]	Lab Studies in Animal Physiology I
ZOO*3700	[0.50]	Integrative Biology of Invertebrates

Electives or restricted electives to a maximum of 2.75 total credits in this semester.

#### Semester 6

BIOL*3060	[0.50]	Populations, Communities & Ecosystems
ZOO*3050	[0.50]	Developmental Biology
ZOO*3620	[0.50]	Comparative Animal Physiology II
ZOO*3630	[0.25]	Lab Studies in Animal Physiology II

Electives or restricted electives to a maximum of 2.75 total credits in this semester.

#### Semester 7

ZOO*4070	[0.50]	Animal Behaviour
ZOO*4910	[0.50]	Integrative Vertebrate Biology

1.50 electives or restricted electives

#### Semester 8

2.50 electives or restricted electives

\* CIS\*1200 is recommended for those needing to improve their computer skills.

#### Restricted Electives must include:

1. A minimum of 1.00 credits of Arts and/or Social Science electives are required. The list of approved Arts and Social Science electives for B.Sc. students is available at: [http://www.bsc.uoguelph.ca/Approved\\_electives.shtml#arts](http://www.bsc.uoguelph.ca/Approved_electives.shtml#arts)

2. A minimum of 0.50 credits from:

ZOO*4330	[0.50]	Biology of Fishes
ZOO*4920	[0.25]	Lab Studies in Ornithology
ZOO*4940	[0.25]	Lab Studies in Herpetology
ZOO*4950	[0.25]	Lab Studies in Mammalogy

3. A minimum of 0.50 credits from:

BIOL*4410	[0.75]	Field Ecology
BIOL*4610	[0.75]	Arctic Ecology
BIOL*4700	[0.50]	Field Biology
BIOL*4710	[0.25]	Field Biology
BIOL*4800	[0.50]	Field Biology
BIOL*4810	[0.25]	Field Biology
IBIO*4500	[0.75]	Research in Integrative Biology I
IBIO*4510	[0.75]	Research in Integrative Biology II
IBIO*4521/2	[2.00]	Thesis in Integrative Biology
ZOO*4170	[0.50]	Experimental Comparative Animal Physiology
ZOO*4300	[0.75]	Marine Biology and Oceanography

Other field or research courses with approval of faculty advisor.

#### Credit Summary (20.00 Total Credits)

4.00 - First year science core

8.00 - Required science courses semesters 3 - 8

1.00 - Restricted electives (# 2, and 3 in restricted electives list)

3.00 - Approved Science electives

1.00 - Arts and/or Social Science electives (#1 in restricted electives)

3.00 - Free electives - any approved elective for B.Sc. students

Of the total credits required, students are required to complete 16.00 credits in science of which a minimum of 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

#### Minor (Honours Program)

Students in majors other than Zoology, Biodiversity, Wildlife Biology & Conservation and Marine & Freshwater Biology who have a strong interest in Zoology may choose to take a minor in Zoology.

A minor in Zoology requires a minimum of 5.00 credits, 4.00 of which must be from the following list:

BIOL*2060	[0.50]	Ecology
BIOL*2400	[0.50]	Evolution
BIOL*3060	[0.50]	Populations, Communities & Ecosystems
ZOO*2090	[0.50]	Vertebrate Structure and Function
ZOO*2700	[0.50]	Invertebrate Morphology & Evolution
ZOO*3000	[0.50]	Comparative Histology
ZOO*3050	[0.50]	Developmental Biology
ZOO*3600	[0.50]	Comparative Animal Physiology I
ZOO*3610	[0.25]	Lab Studies in Animal Physiology I
ZOO*3620	[0.50]	Comparative Animal Physiology II
ZOO*3630	[0.25]	Lab Studies in Animal Physiology II

ZOO*3700	[0.50]	Integrative Biology of Invertebrates
ZOO*4070	[0.50]	Animal Behaviour
ZOO*4330	[0.50]	Biology of Fishes
ZOO*4910	[0.50]	Integrative Vertebrate Biology
ZOO*4920	[0.25]	Lab Studies in Ornithology
ZOO*4940	[0.25]	Lab Studies in Herpetology
ZOO*4950	[0.25]	Lab Studies in Mammalogy

The remaining 1.00 credits may also come from this list or from outside this list, in consultation with a faculty advisor.

## Bachelor of Science in Agriculture [B.Sc.(Agr.)]

The B.Sc.(Agr.) degree program is a 4 year honours science program designed to provide a fundamental education in the science of agriculture. The curriculum includes courses in the agricultural sciences, the physical, biological and social sciences, and in the arts.

### Program Information

Agricultural scientists must be effective communicators and problem solvers, self-directed in their learning, and have a global perspective of the agrifood systems. Students will be involved in co-operative group learning activities and will experience courses that are multidisciplinary and integrate the teaching activities of many faculty and departments.

Students will have the option of completing a broad agricultural program (honours agricultural science) or another major in which they take courses towards a more focused subject area. The curriculum provides opportunities for students to select courses that will help them prepare for professional careers as entrepreneurs, scientists, marketing specialists, financial managers, technical advisors, or communication specialists. Students will have a comprehensive understanding of the food system when they graduate. They will be able to integrate their knowledge of production agriculture, environmental management, resource allocation and business management as it applies to the food system nationally and globally.

Students will be encouraged to integrate their academic program with a well-planned series of employment activities in the summer months and to develop their leadership and interpersonal skills in on-campus and community activities.

Graduates meet the educational requirements for membership in the Ontario Institute of Agrologists. The Ontario Institute of Agrologists is the professional organization in agriculture in the Province of Ontario. Professional institutes in the various provinces in Canada and the scientific societies in agriculture collectively comprise the Agricultural Institute of Canada. The program received full accreditation from the Agricultural Institute of Canada in April 2007.

### B.Sc.(Agr.) Majors:

- Animal Science
- Crop, Horticulture and Turfgrass Science
- Honours Agricultural Science
- Organic Agriculture

### Declaration of a Major

All students are admitted into an undeclared major upon entry. Students will be required to select a major by semester 3 through consultation with the Program Counsellor and Faculty Advisors. The course requirements are listed for each major in the following section.

Students may, with appropriate approvals, elect to complete Minors associated with other degree programs as listed in the undergraduate calendar.

### Honours Minor

A minor is a group of courses which provides for exposure to and mastery of the fundamental principles of a subject. A minor consists of a minimum of 5.00 credits (normally 10 courses). It may also require certain other courses from other areas to be taken along with the specified courses of the minor. A minor is taken in conjunction with a major.

A maximum of 2.50 credits required in a major program may be applied to meet the requirements of a minor.

Students should seek advice from the B.Sc.(Agr.) Program Counsellor about the addition of a minor. Students in the B.Sc.(Agr.) are not eligible for a minor in Agriculture.

### Study Abroad

The B.Sc.(Agr.) degree program is similar in many respects to programs offered at faculties of agricultural science in other provinces in Canada. Students are strongly encouraged to consider studying for 1 or 2 semesters in other faculties of agricultural science in Canada and in selected countries around the world.

Students interested in studying at another institution should consult the B.Sc.(Agr.) Program Counsellor to discuss their plans, and refer to the scholarship section for financial support.

For more specific information on these opportunities refer to Section V--International Study in this calendar, or contact the OAC Dean's Office.

### Doctor of Veterinary Medicine

Students in the B.Sc.(Agr.) program may apply for admission to the D.V.M. program after semester 4 or later. Applications must be submitted to the Admissions Services, Office of Registrarial Services. Students should consult the D.V.M. Section of the calendar. Students who do not gain admission to the D.V.M. program are eligible to continue in the B.Sc.(Agr.) program through to graduation.

Students planning to enter the D.V.M. program are advised to include 12U biology, 12U chemistry, and 12U physics in addition to calculus in secondary school.

### Continuation of Study

Students are advised to consult the regulations for continuation of study within the program which are outlined in detail in Section VIII--Undergraduate Degree Regulations & Procedures.

### Conditions of Graduation

To qualify for the degree Bachelor of Science (Agriculture), the student must successfully complete a minimum of 20.00 credits as set out in the Schedule of Studies listed below. In addition, students must meet the continuation of study requirements at the time of graduation and have a minimum of 60% cumulative average.

### Honours Agriculture (AGRS)

Departments of Plant Agriculture and Animal Biosciences

The Honours Agriculture major combines a core curriculum of agricultural science courses with a wide range of electives focusing on agri-food business, animal and plant production, land stewardship and sustainability. This major allows students to create a curriculum uniquely tailored to their career goals and provides diverse opportunities to explore international agriculture and leading edge agricultural research in animal production, plant biotechnology and pest management. The flexibility provided in semesters 5 and 6 permits students to participate in international exchanges and semesters abroad. Students can also incorporate a variety of field trips, experiential learning in the workplace and independent study into their program of studies. The combination of a solid understanding of life science and current agricultural practice with specialized skills and experience provided by this program is greatly valued by prospective employers in this essential sector of Canada's economy.

#### Semester 1

AGR*1110	[1.00]	Introduction to the Agri-Food Systems
BIOL*1050	[0.50]	Biology of Plants & Animals in Managed Ecosystems
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I

#### Semester 2

AGR*2050	[0.50]	Agroecology
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
FARE*1400	[1.00]	Economics of the Agri-Food System

#### Semester 3

AGR*2320	[0.50]	Soils in Agroecosystems
AGR*2350	[0.50]	Animal Production Systems, Health and Industry
AGR*2470	[0.50]	Introduction to Plant Agriculture
FARE*2700	[0.50]	Survey of Natural Resource Economics
MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics

#### Semester 4

ANSC*2340	[0.50]	Structure of Farm Animals
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management
STAT*2040	[0.50]	Statistics I
1.00 electives or restricted electives		

#### Semester 5 to 8

Students must choose either Option A (Production and Management) or B (Research).

#### Option A - Production and Management

##### Semester 5

FOOD*3090	[0.50]	Food Science and Human Nutrition
2.00 electives or restricted electives		

##### Semester 6

2.50 electives or restricted electives

##### Semester 7

2.50 electives or restricted electives

##### Semester 8

AGR*4600	[1.00]	Agriculture and Food Issues Problem Solving
1.50 electives or restricted electives		

#### Restricted Electives - Option A

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

- A minimum of 1.00 credits from the list of restricted electives below:

AGR*2500	[0.50]	Field Course in International Agriculture
AGR*3010	[0.50]	Special Studies in Agricultural Science I
AGR*3450	[0.50]	Research Methods in Agricultural Science
AGR*3500	[0.50]	Experiential Education I
ANSC*4230	[0.50]	Challenges and Opportunities in Animal Production
ANSC*4610	[0.50]	Critical Analysis in Animal Science
CROP*4260	[0.50]	Crop Science Field Trip
EDRD*2020	[0.50]	Interpersonal Communication
EDRD*3050	[0.50]	Agricultural Communication I
EDRD*3140	[0.50]	Organizational Communication
FARE*3310	[0.50]	Operations Management
FARE*4220	[0.50]	Advanced Agribusiness Management

FARE*4310	[0.50]	Resource Economics
FARE*4360	[0.50]	Marketing Research
FARE*4550	[0.50]	Independent Studies I

• A minimum of 2.00 credits from the following lists:

A minimum of 0.50 credits from the following list:

CROP*3300	[0.50]	Grain Crops
CROP*3310	[0.50]	Protein and Oilseed Crops
CROP*3340	[0.50]	Managed Grasslands
ENVS*4090	[0.50]	Soil Management
ENVS*4160	[0.50]	Soil and Nutrient Management
HORT*2450	[0.50]	Introduction to Turfgrass Science
HORT*3150	[0.50]	Principles and Applications of Plant Propagation
HORT*4380	[0.50]	Tropical and Sub-Tropical Crops
PBIO*3110	[0.50]	Crop Physiology
PBIO*3750	[0.50]	Plant Tissue Culture

A minimum of 0.50 credits from the following list:

CROP*4240	[0.50]	Weed Science
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3210	[0.50]	Plant Pathology
ENVS*3230	[0.50]	Agroforestry Systems

A minimum of 0.50 credits from the following list:

ACCT*1220	[0.50]	Introductory Financial Accounting
ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2310	[0.50]	Intermediate Microeconomics
FARE*2410	[0.50]	Agri-food Markets and Policy
FARE*3170	[0.50]	Cost-Benefit Analysis

Students may also take any of the following courses as restricted electives:

BIOC*2580	[0.50]	Introduction to Biochemistry
BOT*2100	[0.50]	Life Strategies of Plants
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MBG*3060	[0.50]	Quantitative Genetics
OAGR*2070	[1.00]	Introduction to Organic Agriculture

• A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to Program Counsellor for list of agricultural science courses.

• A humanities or social science courses (0.50 credits) at the 1000-level or above. See Program Counsellor for acceptable list of courses.

### Option B - Research

#### Semester 5

AGR*3450	[0.50]	Research Methods in Agricultural Science
FOOD*3090	[0.50]	Food Science and Human Nutrition

1.50 electives or restricted electives

#### Semester 6

2.50 electives or restricted electives

#### Semester 7

AGR*4450	[1.00]	Research Project I
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1.50 electives or restricted electives

#### Semester 8

AGR*4460	[1.00]	Research Project II
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1.50 electives or restricted electives

### Restricted Electives - Option B

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

1. minimum of 2.00 credits from the list of restricted electives below:

A minimum of 0.50 credits from the following list:

CROP*3300	[0.50]	Grain Crops
CROP*3310	[0.50]	Protein and Oilseed Crops
CROP*3340	[0.50]	Managed Grasslands
ENVS*4090	[0.50]	Soil Management
ENVS*4160	[0.50]	Soil and Nutrient Management
HORT*2450	[0.50]	Introduction to Turfgrass Science
HORT*3150	[0.50]	Principles and Applications of Plant Propagation
HORT*4380	[0.50]	Tropical and Sub-Tropical Crops
PBIO*3110	[0.50]	Crop Physiology
PBIO*3750	[0.50]	Plant Tissue Culture

A minimum of 0.50 credits from the following list:

CROP*4240	[0.50]	Weed Science
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3210	[0.50]	Plant Pathology

ENVS*3230	[0.50]	Agroforestry Systems
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A minimum of 0.50 credits from the following list:

ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2310	[0.50]	Intermediate Microeconomics
FARE*2410	[0.50]	Agri-food Markets and Policy
FARE*3170	[0.50]	Cost-Benefit Analysis

Students may also take any of the following courses as restricted electives:

BIOC*2580	[0.50]	Introduction to Biochemistry
BOT*2100	[0.50]	Life Strategies of Plants
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MBG*3060	[0.50]	Quantitative Genetics
OAGR*2070	[1.00]	Introduction to Organic Agriculture

2. A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to Program Counsellor for list of agricultural science courses.

3. A humanities or social science courses (0.50 credits) at the 1000-level or above. See Program Counsellor for acceptable list of courses.

## Agriculture (AGR)

### OAC Dean's Office

#### Minor (Honours Program)

The requirement of 5.00 credits for the minor is divided into three groups of courses: required courses and two lists of restricted electives. Students should ensure that they obtain the necessary prerequisites for required and restricted elective courses. Students should seek academic counselling from the B.Sc.(Agr) Program Counsellor early in their program. This minor is not open to students in the B.Sc.(Agr) Program.

#### Minor

A minimum of 5.00 credits is required including:

AGR*1110	[1.00]	Introduction to the Agri-Food Systems
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1.50 credits from the following Restricted Elective list:

AGR*2050	[0.50]	Agroecology
AGR*2320	[0.50]	Soils in Agroecosystems
AGR*2350	[0.50]	Animal Production Systems, Health and Industry
AGR*2470	[0.50]	Introduction to Plant Agriculture
AGR*2500	[0.50]	Field Course in International Agriculture
EDRD*3400	[0.50]	Sustainable Communities
FARE*1400	[1.00]	Economics of the Agri-Food System
FOOD*3090	[0.50]	Food Science and Human Nutrition

2.50 credits from the following Restricted Elective list, without regard to group:

Note: At least 0.50 credits from the following list must be at the 4000 level and 1.00 credits at the 3000 level or higher.

Agromony:

CROP*3300	[0.50]	Grain Crops
CROP*3310	[0.50]	Protein and Oilseed Crops
CROP*3340	[0.50]	Managed Grasslands
CROP*4220	[0.50]	Cropping Systems
CROP*4240	[0.50]	Weed Science
HORT*4380	[0.50]	Tropical and Sub-Tropical Crops
PBIO*3110	[0.50]	Crop Physiology

Animal Science:

ANSC*1210	[1.00]	Principles of Animal Care and Welfare
ANSC*2330	[0.50]	Horse Management Science
ANSC*2340	[0.50]	Structure of Farm Animals
ANSC*3080	[0.50]	Agricultural Animal Physiology
MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics
MBG*3060	[0.50]	Quantitative Genetics

Environmental Biology:

ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3040	[0.50]	Natural Chemicals in the Environment
ENVS*3210	[0.50]	Plant Pathology
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests

Horticultural Science:

HORT*3150	[0.50]	Principles and Applications of Plant Propagation
HORT*3280	[0.50]	Greenhouse Production
HORT*4300	[0.50]	Postharvest Physiology
PBIO*3110	[0.50]	Crop Physiology
PBIO*3750	[0.50]	Plant Tissue Culture

Resource Management:

ENVS*2120	[0.50]	Introduction to Environmental Stewardship
ENVS*2030	[0.50]	Meteorology and Climatology
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management
ENVS*3050	[0.50]	Microclimatology



ENVS*3080	[0.50]	Soil and Water Conservation
ENVS*4090	[0.50]	Soil Management
ENVS*4160	[0.50]	Soil and Nutrient Management

**Students may also count the following courses as restricted electives:**

AGR*4600	[1.00]	Agriculture and Food Issues Problem Solving
FARE*4000	[0.50]	Agricultural and Food Policy
FARE*4220	[0.50]	Advanced Agribusiness Management

**Animal Science (ANSC)****Department of Animal Biosciences**

The animal science curriculum is designed to provide a broad opportunity to study animal physiology, nutrition, genetics, behaviour and welfare across a range of large and small domestic animal species. The program is designed around an option to follow a Production and Management focus or a Research focus in semesters 5-8 with additional flexibility to allow for a semester of study abroad.

**Semester 1**

AGR*1110	[1.00]	Introduction to the Agri-Food Systems
BIOL*1050	[0.50]	Biology of Plants & Animals in Managed Ecosystems
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I

**Semester 2**

AGR*2050	[0.50]	Agroecology
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
FARE*1400	[1.00]	Economics of the Agri-Food System

**Semester 3**

AGR*2320	[0.50]	Soils in Agroecosystems
AGR*2350	[0.50]	Animal Production Systems, Health and Industry
AGR*2470	[0.50]	Introduction to Plant Agriculture
MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics

One of:

FARE*2700	[0.50]	Survey of Natural Resource Economics
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics

**Semester 4**

ANSC*1210	[1.00]	Principles of Animal Care and Welfare
ANSC*2340	[0.50]	Structure of Farm Animals
BIOC*2580	[0.50]	Introduction to Biochemistry
STAT*2040	[0.50]	Statistics I

**Semester 5 to 8**

Students must choose either Option A (Production and Management) or B (Research).

**Option A - Production and Management****Semester 5**

ANSC*3080	[0.50]	Agricultural Animal Physiology
ANSC*3120	[0.50]	Introduction to Animal Nutrition
NUTR*3210	[0.50]	Fundamentals of Nutrition

1.00 electives or restricted electives

**Semester 6**

ANSC*3040	[0.50]	Animal Reproduction
ANSC*3270	[0.50]	Animal Disorders
MBG*3060	[0.50]	Quantitative Genetics

1.00 electives or restricted electives

**Semester 7**

2.50 electives or restricted electives

**Semester 8**

AGR*4600	[1.00]	Agriculture and Food Issues Problem Solving
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1.50 electives or restricted electives

**Restricted Electives - Option A**

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

1. A minimum of 1.00 credits from the list:

AGR*2500	[0.50]	Field Course in International Agriculture
AGR*3010	[0.50]	Special Studies in Agricultural Science I
AGR*3450	[0.50]	Research Methods in Agricultural Science
AGR*3500	[0.50]	Experiential Education I
ANSC*4230	[0.50]	Challenges and Opportunities in Animal Production
ANSC*4610	[0.50]	Critical Analysis in Animal Science
CROP*4260	[0.50]	Crop Science Field Trip
EDRD*2020	[0.50]	Interpersonal Communication
EDRD*3050	[0.50]	Agricultural Communication I
EDRD*3140	[0.50]	Organizational Communication
FARE*3310	[0.50]	Operations Management

FARE*4220	[0.50]	Advanced Agribusiness Management
FARE*4310	[0.50]	Resource Economics
FARE*4360	[0.50]	Marketing Research
FARE*4550	[0.50]	Independent Studies I

2. A minimum of 3.00 credits is required from the following lists:

A minimum of 0.50 credits from the following list:

ANSC*4050	[0.50]	Biotechnology in Animal Science
MBG*4020	[0.50]	Genetics of Companion Animals
MBG*4030	[0.50]	Animal Breeding Methods and Applications

A minimum of 1.00 credits from the following list:

ANSC*3170	[0.50]	Nutrition of Fish and Crustacea
ANSC*3180	[0.50]	Wildlife Nutrition
ANSC*4260	[0.50]	Beef Cattle Nutrition
ANSC*4270	[0.50]	Dairy Cattle Nutrition
ANSC*4280	[0.50]	Poultry Nutrition
ANSC*4290	[0.50]	Swine Nutrition
ANSC*4470	[0.50]	Animal Metabolism
ANSC*4560	[0.50]	Pet Nutrition
EQN*4020	[0.50]	Advanced Equine Nutrition

A minimum of 1.00 credits from the following list:

ANSC*4090	[0.50]	Applied Animal Behaviour
ANSC*4100	[0.50]	Applied Environmental Physiology and Animal Housing
ANSC*4490	[0.50]	Applied Endocrinology
ANSC*4650	[0.50]	Comparative Immunology
EQN*3050	[0.50]	Equine Exercise Physiology

3. A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to Program Counsellor for list of agricultural science courses.

4. A humanities or social science courses (0.50 credits) at the 1000-level or above. See Program Counsellor for acceptable list of courses.

**Option B - Research****Semester 5**

AGR*3450	[0.50]	Research Methods in Agricultural Science
ANSC*3080	[0.50]	Agricultural Animal Physiology
ANSC*3120	[0.50]	Introduction to Animal Nutrition
NUTR*3210	[0.50]	Fundamentals of Nutrition

0.50 electives or restricted electives

**Semester 6**

ANSC*3040	[0.50]	Animal Reproduction
ANSC*3270	[0.50]	Animal Disorders
MBG*3060	[0.50]	Quantitative Genetics

1.00 electives or restricted electives

**Semester 7**

2.50 electives or restricted electives

**Semester 8**

2.50 electives or restricted electives

**Restricted Electives - Option B**

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

1. A minimum of 1.00 credits from the following list (normally to be taken during semesters 7 and 8):

ANSC*4610	[0.50]	Critical Analysis in Animal Science
ANSC*4700	[0.50]	Research in Animal Biology I
ANSC*4710	[0.50]	Research in Animal Biology II

2. A minimum of 3.00 credits is required from the following lists:

A minimum of 0.50 credits from the following list:

ANSC*4050	[0.50]	Biotechnology in Animal Science
MBG*4020	[0.50]	Genetics of Companion Animals
MBG*4030	[0.50]	Animal Breeding Methods and Applications

A minimum of 1.00 credits from the following list:

ANSC*3170	[0.50]	Nutrition of Fish and Crustacea
ANSC*3180	[0.50]	Wildlife Nutrition
ANSC*4260	[0.50]	Beef Cattle Nutrition
ANSC*4270	[0.50]	Dairy Cattle Nutrition
ANSC*4280	[0.50]	Poultry Nutrition
ANSC*4290	[0.50]	Swine Nutrition
ANSC*4470	[0.50]	Animal Metabolism
ANSC*4560	[0.50]	Pet Nutrition
EQN*4020	[0.50]	Advanced Equine Nutrition

A minimum of 1.00 credits from the following list:

ANSC*4090	[0.50]	Applied Animal Behaviour
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ANSC*4100	[0.50]	Applied Environmental Physiology and Animal Housing
ANSC*4490	[0.50]	Applied Endocrinology
ANSC*4650	[0.50]	Comparative Immunology
EQN*3050	[0.50]	Equine Exercise Physiology

3. A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to Program Counsellor for list of agricultural science courses.

4. A humanities or social science courses (0.50 credits) at the 1000-level or above from the College of Arts or College of Social and Applied Human Sciences. See Program Counsellor for acceptable list of courses.

## Crop, Horticulture and Turfgrass Sciences (CHAT)

### Department of Plant Agriculture

The Crop, Horticultural and Turfgrass Sciences major is for students who want to apply the latest advancements in the biological sciences to contemporary problems in the plant production industries. This major is appropriate for students with a focus on the production of field crops for food, fuel or biomaterials, management of today's advanced commercial greenhouses, horticultural production, breeding improved crop varieties, or using turfgrass and other plant species to enhance urban environments. The flexibility provided in semester 6 permits students to participate in international exchanges and semesters abroad. Students can also incorporate a variety of field trips, experiential learning in the workplace and independent study into their program of studies.

### Semester 1

AGR*1110	[1.00]	Introduction to the Agri-Food Systems
BIOL*1050	[0.50]	Biology of Plants & Animals in Managed Ecosystems
CHEM*1040	[0.50]	General Chemistry I
MATH*1080	[0.50]	Elements of Calculus I

### Semester 2

AGR*2050	[0.50]	Agroecology
BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
FARE*1400	[1.00]	Economics of the Agri-Food System

### Semester 3

AGR*2320	[0.50]	Soils in Agroecosystems
AGR*2350	[0.50]	Animal Production Systems, Health and Industry
AGR*2470	[0.50]	Introduction to Plant Agriculture
FARE*2700	[0.50]	Survey of Natural Resource Economics
MBG*2400	[0.50]	Fundamentals of Plant and Animal Genetics

### Semester 4

BIOC*2580	[0.50]	Introduction to Biochemistry
BOT*2100	[0.50]	Life Strategies of Plants
ENVS*2040	[0.50]	Plant Health and the Environment
STAT*2040	[0.50]	Statistics I

0.50 electives or restricted electives

**Note:** Students who wish to add business courses to their program are advised to take ACCT\*1220 in semester 4 and ACCT\*2230 in semester 5.

### Semester 5 to 8

Students must choose either Option A (Production and Management) or B (Research).

#### Option A - Production and Management

### Semester 5

FOOD*3090	[0.50]	Food Science and Human Nutrition
PBIO*3110	[0.50]	Crop Physiology

1.50 electives or restricted electives

### Semester 6

2.50 electives or restricted electives

### Semester 7

One of:

ENVS*4090	[0.50]	Soil Management
ENVS*4160	[0.50]	Soil and Nutrient Management

2.00 electives or restricted electives

### Semester 8

AGR*4600	[1.00]	Agriculture and Food Issues Problem Solving
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1.50 electives or restricted electives

### Restricted Electives - Option A

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

1. A minimum of 1.00 credits from the following list:

AGR*3010	[0.50]	Special Studies in Agricultural Science I
AGR*3450	[0.50]	Research Methods in Agricultural Science
AGR*3500	[0.50]	Experiential Education I

CROP*4260	[0.50]	Crop Science Field Trip
EDRD*3050	[0.50]	Agricultural Communication I
EDRD*3140	[0.50]	Organizational Communication
FARE*3310	[0.50]	Operations Management
FARE*4220	[0.50]	Advanced Agribusiness Management
FARE*4310	[0.50]	Resource Economics
FARE*4550	[0.50]	Independent Studies I

2. Students must select a minimum of 3.00 credits from the below, without regard to group. Courses are organized into three subject areas only to provide guidance to students who wish to concentrate in a particular area of plant agriculture.

#### Crop Science:

AGR*2500	[0.50]	Field Course in International Agriculture
CROP*3300	[0.50]	Grain Crops
CROP*3310	[0.50]	Protein and Oilseed Crops
CROP*3340	[0.50]	Managed Grasslands
CROP*4220	[0.50]	Cropping Systems
CROP*4240	[0.50]	Weed Science
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management
ENVS*3080	[0.50]	Soil and Water Conservation
ENVS*3210	[0.50]	Plant Pathology
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests
HORT*4380	[0.50]	Tropical and Sub-Tropical Crops
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MBG*3100	[0.50]	Plant Genetics
MBG*4160	[0.50]	Plant Breeding
OAGR*2070	[1.00]	Introduction to Organic Agriculture
OAGR*4050	[1.00]	Design of Organic Production Systems
PBIO*3750	[0.50]	Plant Tissue Culture
PBIO*4070	[0.50]	Biological and Cultural Control of Plant Diseases
PBIO*4750	[0.50]	Genetic Engineering of Plants

#### Horticultural Science:

CROP*4240	[0.50]	Weed Science
ENVS*3210	[0.50]	Plant Pathology
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests
HORT*2450	[0.50]	Introduction to Turfgrass Science
HORT*3010	[0.50]	Annual, Perennial and Indoor Plants - Identification and Use
HORT*3150	[0.50]	Principles and Applications of Plant Propagation
HORT*3270	[0.50]	Medicinal Plants
HORT*3280	[0.50]	Greenhouse Production
HORT*3510	[0.50]	Vegetable Production
HORT*4300	[0.50]	Postharvest Physiology
HORT*4420	[0.50]	Fruit Crops
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MBG*3100	[0.50]	Plant Genetics
MBG*4160	[0.50]	Plant Breeding
PBIO*3750	[0.50]	Plant Tissue Culture
PBIO*4070	[0.50]	Biological and Cultural Control of Plant Diseases
PBIO*4750	[0.50]	Genetic Engineering of Plants

#### Turfgrass Science:

CROP*4240	[0.50]	Weed Science
ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3140	[0.50]	Management of Turfgrass Diseases
HORT*2450	[0.50]	Introduction to Turfgrass Science
HORT*3050	[0.50]	Management of Turfgrass Insect Pests and Weeds
HORT*4200	[0.50]	Plants, the Environment and Society
HORT*4450	[0.50]	Advanced Turfgrass Science

3. A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to Program Counsellor for list of agricultural

4. A humanities or social science courses (0.50 credits) at the 1000-level or above from the College of Arts or College of Social and Applied Human Sciences. See Program Counsellor for acceptable list of courses.

#### Option B - Research

### Semester 5

AGR*3450	[0.50]	Research Methods in Agricultural Science
FOOD*3090	[0.50]	Food Science and Human Nutrition
PBIO*3110	[0.50]	Crop Physiology

1.00 electives or restricted electives

### Semester 6

2.50 electives or restricted electives

### Semester 7

AGR*4450	[1.00]	Research Project I
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One of:

ENVS*4090	[0.50]	Soil Management
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ENVS\*4160 [0.50] Soil and Nutrient Management  
1.00 electives or restricted electives

**Semester 8**

AGR\*4460 [1.00] Research Project II  
1.50 electives or restricted electives

**Restricted Electives - Option B**

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

1. During semesters 4-8 students must select a minimum of 3.00 credits from the lists of restricted electives below, without regard to group. Courses are organized into three subject areas only to provide guidance to students who wish to concentrate in a particular area of plant agriculture.

**Crop Science:**

AGR\*2500 [0.50] Field Course in International Agriculture  
CROP\*3300 [0.50] Grain Crops  
CROP\*3310 [0.50] Protein and Oilseed Crops  
CROP\*3340 [0.50] Managed Grasslands  
CROP\*4220 [0.50] Cropping Systems  
CROP\*4240 [0.50] Weed Science  
ENVS\*2340 [0.50] Current Issues in Agriculture and Landscape Management

ENVS\*3080 [0.50] Soil and Water Conservation  
ENVS\*3210 [0.50] Plant Pathology  
ENVS\*4100 [0.50] Integrated Management of Invasive Insect Pests  
HORT\*4380 [0.50] Tropical and Sub-Tropical Crops  
MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics  
MBG\*3100 [0.50] Plant Genetics  
MBG\*4160 [0.50] Plant Breeding  
OAGR\*2070 [1.00] Introduction to Organic Agriculture  
OAGR\*4050 [1.00] Design of Organic Production Systems  
PBIO\*3750 [0.50] Plant Tissue Culture  
PBIO\*4070 [0.50] Biological and Cultural Control of Plant Diseases  
PBIO\*4750 [0.50] Genetic Engineering of Plants

**Horticultural Science:**

CROP\*4240 [0.50] Weed Science  
ENVS\*3210 [0.50] Plant Pathology  
ENVS\*4100 [0.50] Integrated Management of Invasive Insect Pests  
HORT\*2450 [0.50] Introduction to Turfgrass Science  
HORT\*3010 [0.50] Annual, Perennial and Indoor Plants - Identification and Use  
HORT\*3150 [0.50] Principles and Applications of Plant Propagation  
HORT\*3270 [0.50] Medicinal Plants  
HORT\*3280 [0.50] Greenhouse Production  
HORT\*3510 [0.50] Vegetable Production  
HORT\*4300 [0.50] Postharvest Physiology  
HORT\*4420 [0.50] Fruit Crops  
MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics  
MBG\*3100 [0.50] Plant Genetics  
MBG\*4160 [0.50] Plant Breeding  
PBIO\*3750 [0.50] Plant Tissue Culture  
PBIO\*4070 [0.50] Biological and Cultural Control of Plant Diseases  
PBIO\*4750 [0.50] Genetic Engineering of Plants

**Turfgrass Science:**

CROP\*4240 [0.50] Weed Science  
ENVS\*3020 [0.50] Pesticides and the Environment  
ENVS\*3140 [0.50] Management of Turfgrass Diseases  
HORT\*2450 [0.50] Introduction to Turfgrass Science  
HORT\*3050 [0.50] Management of Turfgrass Insect Pests and Weeds  
HORT\*4200 [0.50] Plants, the Environment and Society  
HORT\*4450 [0.50] Advanced Turfgrass Science

2. A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to the Program Counsellor for the list of agricultural science courses.
3. A humanities or social science courses (0.50 credits) at the 1000-level or above from the College of Arts or College of Social and Applied Human Sciences. See Program Counsellor for acceptable list of courses.

**Business Electives:**

Students in either Option A or Option B who wish to add business courses to their program are advised to select courses from the following list:

FARE\*3310 [0.50] Operations Management  
FARE\*4220 [0.50] Advanced Agribusiness Management  
FARE\*4240 [0.50] Futures and Options Markets  
FARE\*4370 [0.50] Food & Agri Marketing Management  
MGMT\*3320 [0.50] Financial Management

**Organic Agriculture (OAGR)****Department of Plant Agriculture and School of Environmental Sciences**

The Major in Organic Agriculture encompasses agroecology, food safety and security, land stewardship, animal welfare, environmental health, and sustainable rural communities. It offers an integrated systems approach to the design and operation of crop and livestock production systems that are socially responsible, ecologically sound and economically sustainable. The program combines core courses in life sciences and modern agricultural practice with in depth analysis of organic production systems, soil and nutrient management, pest management and farm economics. Linkages between profitability and sustainability are explored through independent and group research projects, experiential learning, field trips and opportunities for study abroad. In addition to the core courses, students can incorporate experiential learning and independent research courses focusing on social, economic and scientific aspects of organic agriculture and sustainability to their program of studies. This innovative and flexible program will provide the knowledge and skills you will need for career success in this dynamic sector.

**Semester 1**

AGR\*1110 [1.00] Introduction to the Agri-Food Systems  
BIOL\*1050 [0.50] Biology of Plants & Animals in Managed Ecosystems  
CHEM\*1040 [0.50] General Chemistry I  
MATH\*1080 [0.50] Elements of Calculus I

**Semester 2**

AGR\*2050 [0.50] Agroecology  
BIOL\*1090 [0.50] Introduction to Molecular and Cellular Biology  
CHEM\*1050 [0.50] General Chemistry II  
FARE\*1400 [1.00] Economics of the Agri-Food System

**Semester 3**

AGR\*2320 [0.50] Soils in Agroecosystems  
AGR\*2350 [0.50] Animal Production Systems, Health and Industry  
AGR\*2470 [0.50] Introduction to Plant Agriculture  
FARE\*2700 [0.50] Survey of Natural Resource Economics  
MBG\*2400 [0.50] Fundamentals of Plant and Animal Genetics

**Semester 4**

ENVS\*2040 [0.50] Plant Health and the Environment  
OAGR\*2070 [1.00] Introduction to Organic Agriculture  
STAT\*2040 [0.50] Statistics I

0.50 electives or restricted electives

**Semester 5 to 8**

Students must choose either Option A (Production and Management) or B (Research).

**Option A- Production and Management****Semester 5**

FOOD\*3090 [0.50] Food Science and Human Nutrition  
2.00 electives or restricted electives

**Semester 6**

2.50 electives or restricted electives

**Semester 7**

OAGR\*4050 [1.00] Design of Organic Production Systems  
1.50 electives or restricted electives

**Semester 8**

AGR\*4600 [1.00] Agriculture and Food Issues Problem Solving  
1.50 electives or restricted electives

**Restricted Electives - Option A**

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

1. A minimum of 1.00 credits from the list:

AGR\*2500 [0.50] Field Course in International Agriculture  
AGR\*3010 [0.50] Special Studies in Agricultural Science I  
AGR\*3450 [0.50] Research Methods in Agricultural Science  
AGR\*3500 [0.50] Experiential Education I  
ANSC\*4230 [0.50] Challenges and Opportunities in Animal Production

ANSC\*4610 [0.50] Critical Analysis in Animal Science  
CROP\*4260 [0.50] Crop Science Field Trip  
EDRD\*2020 [0.50] Interpersonal Communication  
EDRD\*3050 [0.50] Agricultural Communication I  
EDRD\*3140 [0.50] Organizational Communication  
FARE\*3310 [0.50] Operations Management  
FARE\*4220 [0.50] Advanced Agribusiness Management  
FARE\*4310 [0.50] Resource Economics  
FARE\*4360 [0.50] Marketing Research  
FARE\*4550 [0.50] Independent Studies I

2. Students must select a minimum of 3.50 credits from the following lists:

Minimum of 2.50 credits from the following list

ANSC*2340	[0.50]	Structure of Farm Animals
ANSC*3120	[0.50]	Introduction to Animal Nutrition
CROP*3300	[0.50]	Grain Crops
CROP*3310	[0.50]	Protein and Oilseed Crops
CROP*3340	[0.50]	Managed Grasslands
CROP*4220	[0.50]	Cropping Systems
CROP*4240	[0.50]	Weed Science
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management

ENVS*3080	[0.50]	Soil and Water Conservation
ENVS*3210	[0.50]	Plant Pathology
ENVS*4090	[0.50]	Soil Management
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests
ENVS*4160	[0.50]	Soil and Nutrient Management
HORT*3510	[0.50]	Vegetable Production
HORT*4420	[0.50]	Fruit Crops
PBIO*3110	[0.50]	Crop Physiology

A minimum of 0.50 credits from the following list:

EDRD*3400	[0.50]	Sustainable Communities
GEOG*3320	[0.50]	Food Systems: Issues in Security and Sustainability
PHIL*2070	[0.50]	Philosophy of the Environment

Students may also take the following courses:

ACCT*1220	[0.50]	Introductory Financial Accounting
BIOC*2580	[0.50]	Introduction to Biochemistry
BOT*2100	[0.50]	Life Strategies of Plants
ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2310	[0.50]	Intermediate Microeconomics
FARE*2410	[0.50]	Agrifood Markets and Policy
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MBG*3060	[0.50]	Quantitative Genetics
NUTR*3210	[0.50]	Fundamentals of Nutrition

3. A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to Program Counsellor for list of agricultural science courses.

4. A humanities or social science courses (0.50 credits) at the 1000-level or above from the College of Arts or College of Social and Applied Human Sciences. See Program Counsellor for acceptable list of courses.

### Option B - Research

#### Semester 5

AGR*3450	[0.50]	Research Methods in Agricultural Science
FOOD*3090	[0.50]	Food Science and Human Nutrition

1.50 electives or restricted electives

#### Semester 6

2.50 electives or restricted electives

#### Semester 7

AGR*4450	[1.00]	Research Project I
OAGR*4050	[1.00]	Design of Organic Production Systems

0.50 electives or restricted electives

#### Semester 8

AGR*4460	[1.00]	Research Project II
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1.50 electives or restricted electives

### Restricted Electives - Option B

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

1. Students in Option B must select a minimum of 3.50 credits from the following lists:

Minimum of 2.50 credits from the following list:

ANSC*2340	[0.50]	Structure of Farm Animals
ANSC*3120	[0.50]	Introduction to Animal Nutrition
CROP*3300	[0.50]	Grain Crops
CROP*3310	[0.50]	Protein and Oilseed Crops
CROP*3340	[0.50]	Managed Grasslands
CROP*4220	[0.50]	Cropping Systems
CROP*4240	[0.50]	Weed Science
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management

ENVS*3080	[0.50]	Soil and Water Conservation
ENVS*3210	[0.50]	Plant Pathology
ENVS*4090	[0.50]	Soil Management
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests
ENVS*4160	[0.50]	Soil and Nutrient Management
HORT*3510	[0.50]	Vegetable Production
HORT*4420	[0.50]	Fruit Crops

PBIO*3110	[0.50]	Crop Physiology
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A minimum of 0.50 credits from the following list:

EDRD*3400	[0.50]	Sustainable Communities
GEOG*3320	[0.50]	Food Systems: Issues in Security and Sustainability
PHIL*2070	[0.50]	Philosophy of the Environment

Students may also take the following courses as restricted electives:

ACCT*1220	[0.50]	Introductory Financial Accounting
BIOC*2580	[0.50]	Introduction to Biochemistry
BOT*2100	[0.50]	Life Strategies of Plants
ECON*1050	[0.50]	Introductory Microeconomics
ECON*1100	[0.50]	Introductory Macroeconomics
ECON*2310	[0.50]	Intermediate Microeconomics
FARE*2410	[0.50]	Agrifood Markets and Policy
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
MBG*3060	[0.50]	Quantitative Genetics
NUTR*3210	[0.50]	Fundamentals of Nutrition

2. A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to Program Counsellor for list of agricultural science courses.

3. A humanities or social science courses (0.50 credits) at the 1000-level or above from the College of Arts or College of Social and Applied Human Sciences. See Program Counsellor for acceptable list of courses.

## Bachelor of Science in Environmental Sciences [B.Sc.(Env.)]

### Program Information

#### Objectives of the Program

The Environmental Sciences program is designed to provide a strong interdisciplinary grounding in specific environmental sciences including the socioeconomic context in which environmental issues are resolved.

There is an emphasis on management and decision-making skills for the application of scientific knowledge to environmental problems, and the evaluation of appropriate environmental policies. A practical perspective based on defining and resolving problems is central to the program, and this is often done in the context of group work.

Substantial emphasis is placed on communication skills, including the development of competence in both written and oral presentations. These skills will be progressively developed in core courses from the first to the fourth year. Students in the final year of their program will be expected to take part in more intensive communication skill development. Graduates will seek employment in a range of fields, from government agencies to private industry and research.

#### Academic Counselling

General information on the degree program is available from the Program Counsellor. Advising for each major is available through the assigned faculty advisor responsible for the major. Students are encouraged to seek the advice of the faculty advisors when choosing restricted electives and planning course selections.

#### Degree

The degree granted for the successful completion of this honours program will be the Bachelor of Science in Environmental Sciences--B.Sc.(Env.).

#### Continuation of Study

Students are advised to consult the regulations for Continuation of Study in Section VIII--Undergraduate Degree Regulations and Procedures of this Calendar.

#### Conditions for Graduation

In order to graduate from the B.Sc.(Env.) program, students must successfully complete a minimum of 20.00 credits including all the stated course requirements for the program. As well, students must achieve a cumulative average of 60% or higher over all course attempts.

#### Environmental Sciences (Co-op)

A 5-year Honours Program in Environmental Sciences is offered as a Co-operative Education Program. This option is offered within the B.Sc. (Env.) degree and is available to all majors. The course requirements are the same as those listed for the regular B.Sc. (Env.) program, by the Co-operative Education Program and as outlined in the Continuation of Study policy (Section VIII--Undergraduate Degree Regulations & Procedures).

3 co-op work terms (COOP\*1000, COOP\*2000, COOP\*3000) are required. An optional 4th co-op work term (COOP\*4000) is available. COOP\*1100 must be completed during semester 2.

#### Environmental Sciences Co-op Work Term Schedule

Year	Fall	Winter	Summer
1	Academic Term 1	Academic Term 2	Off
2	Academic Term 3	COOP*1000	Academic Term 4
3	COOP*2000	Academic Term 5	COOP*3000
4	Academic Term 6	Academic Term 7	COOP*4000 (Optional)
5	Academic Term 8	N/A	N/A

Since some of the course requirements in the degree program (core or major) are not offered each semester, careful planning and program consultation with the Faculty Co-op Advisor is essential. In particular, students are encouraged to seek advice when choosing for their Summer academic semester.

#### The Environmental Sciences Program

The degree in Environmental Sciences consists of a minimum of 20.00 credits, as follows:

1. 7.00 Environmental Sciences Core
2. 8.50 - 11.00 Environmental Sciences prescribed and restricted electives according to major.
3. free electives\*

Within these courses, students must include at least 6.00 credits at the 3000 or 4000 level, and no program may include more than 7.00 credits at the 1000 level.

\* There are not specific subject requirements for the elective courses, however, you may NOT select the following: BIOL\*1500, BOT\*1200, CHEM\*1100, CIS\*1000, ENVS\*1060, GEOL\*1100, MICR\*1020, MBG\*1000, PHYS\*1600.

Please note that not all courses in the "One of:" options are available each semester (F, W, S). Students are encouraged to seek advice from the appropriate advisor when selecting and scheduling courses.

#### First Year Curriculum

The first year courses have been selected to provide students with sufficient background and knowledge to enter any one of the Environmental Sciences majors.

##### Semester 1

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
ENVS*1030	[1.00]	Introduction to Environmental Sciences
MATH*1080	[0.50]	Elements of Calculus I

##### Semester 2

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
FARE*1040	[1.00]	Intro to Environmental Economics, Law & Policy
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

**Note:** Co-op students must select COOP\*1100 Introduction to Co-operative Education

#### Environmental Sciences Core

In addition to the common first year curriculum, students are required to take the following core Environmental Sciences courses in the semesters recommended in the schedule of studies:

ENVS*4001	[0.50]	Project in Environmental Sciences
ENVS*4002	[0.50]	Project in Environmental Sciences

One of:

ECON*2100	[0.50]	Economic Growth and Environmental Quality
FARE*2700	[0.50]	Survey of Natural Resource Economics
GEOG*3210	[0.50]	Management of the Biophysical Environment

A required statistics course is prescribed by the student's choice of major.

#### Environmental Sciences Majors

Ecology

Environment and Resource Management

Environmental Economics and Policy

Environmental Sciences

Requirements for each of these majors are described in the detailed schedules of studies below.

#### Ecology (ECOL)

##### Department of Integrative Biology, College of Biological Science

This program provides a solid foundation in the principles of ecology, training in both pure and applied aspects of ecology and an introduction to economic, legal and policy issues related to the management of the environment. From the 2nd year on, students increasingly augment the core in ecology and policy with extensive restricted electives choices that allow the student to tailor the program to their interests. The major provides a sound science background for careers in conservation, resource management, ecological consulting, or nature interpretation used in teaching, government, non-government or the private sector; or for further post-graduate training in fundamental ecology, environmental biology and environmental management or policy.

#### Major

##### Semester 1

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
ENVS*1030	[1.00]	Introduction to Environmental Sciences
MATH*1080	[0.50]	Elements of Calculus I

##### Semester 2

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
FARE*1040	[1.00]	Intro to Environmental Economics, Law & Policy
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

##### Semester 3

BIOL*2060	[0.50]	Ecology
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One of:

PHYS*1080	[0.50]	Physics for Life Sciences
PHYS*1300	[0.50]	Fundamentals of Physics

One of:

ECON*2100	[0.50]	Economic Growth and Environmental Quality
FARE*2700	[0.50]	Survey of Natural Resource Economics

1.00 electives or restricted electives

**Note:** Students lacking 4U physics or equivalent must take PHYS\*1300. Students with 4U physics or equivalent must take PHYS\*1080. PHYS\*1130 may be substituted for PHYS\*1080 and would be taken in a Winter semester.

**Note:** GEOG\*3210 may be substituted for ECON\*2100 or FARE\*2700 and would be taken in semester 5.

**Semester 4**

BIOC*2580	[0.50]	Introduction to Biochemistry
BIOL*2400	[0.50]	Evolution
MBG*2040	[0.50]	Foundations in Molecular Biology and Genetics
STAT*2230	[0.50]	Biostatistics for Integrative Biology

0.50 electives or restricted electives

**Semester 5**

BIOL*3010	[0.50]	Laboratory and Field Work in Ecology
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One of:

BOT*2100	[0.50]	Life Strategies of Plants
ZOO*3600	[0.50]	Comparative Animal Physiology I

One of:

BOT*3410	[0.50]	Plant Anatomy
ZOO*2090	[0.50]	Vertebrate Structure and Function

1.00 electives or restricted electives

**Note:** ZOO\*2700 may be substituted for BOT\*3410 or ZOO\*2090 and would be taken in semester 6.**Semester 6**

BIOL*3060	[0.50]	Populations, Communities & Ecosystems
BIOL*3130	[0.50]	Conservation Biology

1.50 electives or restricted electives

**Semester 7**

ENVS*4001	[0.50]	Project in Environmental Sciences
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2.00 electives or restricted electives

**Semester 8**

ENVS*4002	[0.50]	Project in Environmental Sciences
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2.00 electives or restricted electives

**Note:** See note in semester 7.**Restricted Electives**

Students are required to take 5.50 restricted credits in Ecology as noted below. Of these, at least 1.00 credits must be at the 4000 level.

1. A minimum of 0.50 credits from:

BIOL*4150	[0.50]	Wildlife Conservation and Management
CIS*1500	[0.50]	Introduction to Programming
GEOG*2420	[0.50]	The Earth From Space
GEOG*2480	[0.50]	Mapping and GIS
GEOG*3420	[0.50]	Remote Sensing of the Environment *
GEOG*3480	[0.50]	GIS and Spatial Analysis *
GEOG*4480	[1.00]	Applied Geomatics *

\* Additional prerequisites are required.

2. Students in the Ecology Major are required to take an additional 5.00 restricted elective credits from the following lists. Some courses may require other courses from the list as prerequisites.

Ecology

ANSC*3180	[0.50]	Wildlife Nutrition
BIOL*3450	[0.50]	Introduction to Aquatic Environments
BOT*3050	[0.50]	Plant Functional Ecology
ENVS*2030	[0.50]	Meteorology and Climatology
ENVS*3010	[0.50]	Climate Change Biology
ENVS*3270	[0.50]	Forest Biodiversity
ENVS*3290	[0.50]	Waterborne Disease Ecology
ENVS*4350	[0.50]	Forest Ecology
GEOG*2000	[0.50]	Geomorphology
GEOG*2110	[0.50]	Climate and the Biophysical Environment
GEOG*3000	[0.50]	Fluvial Processes
GEOG*3610	[0.50]	Environmental Hydrology
NUTR*3210	[0.50]	Fundamentals of Nutrition
ZOO*4570	[0.50]	Marine Ecological Processes

Conservation

BIOL*4120	[0.50]	Evolutionary Ecology
BIOL*4150	[0.50]	Wildlife Conservation and Management
BIOL*4350	[0.50]	Limnology of Natural and Polluted Waters
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*2330	[0.50]	Current Issues in Ecosystem Science and Biodiversity
ENVS*3000	[0.50]	Nature Interpretation
ENVS*3010	[0.50]	Climate Change Biology
GEOG*2480	[0.50]	Mapping and GIS
GEOG*3020	[0.50]	Global Environmental Change
GEOG*3110	[0.50]	Biotic and Natural Resources
GEOG*3210	[0.50]	Management of the Biophysical Environment
GEOG*3480	[0.50]	GIS and Spatial Analysis
GEOG*4110	[1.00]	Environmental Systems Analysis
GEOG*4230	[0.50]	Environmental Impact Assessment
GEOG*4480	[1.00]	Applied Geomatics

Policy, Law and Management

BIOL*4500	[0.50]	Natural Resource Policy Analysis
ECON*2100	[0.50]	Economic Growth and Environmental Quality
FARE*2700	[0.50]	Survey of Natural Resource Economics
GEOG*2210	[0.50]	Environment and Resources
GEOG*4210	[0.50]	Environmental Governance
GEOG*4220	[0.50]	Local Environmental Management
PHIL*2070	[0.50]	Philosophy of the Environment
POLS*3370	[0.50]	Environmental Politics and Governance
Independent Research and Field Courses		
BIOL*4410	[0.75]	Field Ecology
BIOL*4700	[0.50]	Field Biology
BIOL*4710	[0.25]	Field Biology
BIOL*4800	[0.50]	Field Biology
BIOL*4810	[0.25]	Field Biology
ENVS*3410	[0.50]	Independent Research I
ENVS*3420	[0.50]	Independent Research II
ENVS*3430	[1.00]	Independent Research
IBIO*4500	[0.75]	Research in Integrative Biology I
IBIO*4510	[0.75]	Research in Integrative Biology II
IBIO*4521	[1.00]	Thesis in Integrative Biology
IBIO*4522	[1.00]	Thesis in Integrative Biology
ZOO*4300	[0.75]	Marine Biology and Oceanography

**Credit Summary (20.00 Total Credits)**

7.00 credits - Environmental Sciences core

5.00 credits - Ecology Required courses

5.50 credits - Ecology Restricted electives

2.50 credits - Free electives

Students are reminded that 6.00 credits of their B.Sc. (Env.) degree must be at the 3000-4000 level.

Students are encouraged to seek advice on their choices from their faculty advisor. With prior approval, students may be able to use courses not on these lists towards their Ecology restrictive electives.

**Ecology (ECOL:C)****Department of Integrative Biology, College of Biological Science**

This program provides a solid foundation in the principles of ecology, training in both pure and applied aspects of ecology and an introduction to economic, legal and policy issues related to the management of the environment. From the 2nd year on, students increasingly augment the core in ecology and policy with extensive restricted electives choices that allow the student to tailor the program to their interests. The major provides a sound science background for careers in conservation, resource management, ecological consulting, or nature interpretation used in teaching, government, non-government or the private sector; or for further post-graduate training in fundamental ecology, environmental biology and environmental management or policy.

**Major****Semester 1 - Fall**

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
ENVS*1030	[1.00]	Introduction to Environmental Sciences
MATH*1080	[0.50]	Elements of Calculus I

**Semester 2 - Winter**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
COOP*1100	[0.00]	Introduction to Co-operative Education
FARE*1040	[1.00]	Intro to Environmental Economics, Law & Policy
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

**Semester 3 - Fall**

BIOL*2060	[0.50]	Ecology
One of:		
PHYS*1080	[0.50]	Physics for Life Sciences
PHYS*1300	[0.50]	Fundamentals of Physics
One of:		
ECON*2100	[0.50]	Economic Growth and Environmental Quality
FARE*2700	[0.50]	Survey of Natural Resource Economics

1.00 electives or restricted electives

**Note:** Students lacking 4U physics or equivalent must take PHYS\*1300. Students with 4U physics or equivalent must take PHYS\*1080. PHYS\*1130 may be substituted for PHYS\*1080 and would be taken in a Winter semester.**Note:** GEOG\*3210 may be substituted for ECON\*2100 or FARE\*2700 and would be taken in semester 6.**Winter Semester**

COOP*1000	[0.00]	Co-op Work Term I
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**Semester 4 - Summer**

BIOC\*2580 [0.50] Introduction to Biochemistry  
2.00 electives or restricted electives

**Fall Semester**

COOP\*2000 [0.00] Co-op Work Term II

**Semester 5 - Winter**

BIOL\*2400 [0.50] Evolution  
MBG\*2040 [0.50] Foundations in Molecular Biology and Genetics  
STAT\*2230 [0.50] Biostatistics for Integrative Biology  
1.00 electives or restricted electives

**Summer Semester**

COOP\*3000 [0.00] Co-op Work Term III

**Semester 6 - Fall**

BIOL\*3010 [0.50] Laboratory and Field Work in Ecology  
ENVS\*4001 [0.50] Project in Environmental Sciences

One of:

BOT\*2100 [0.50] Life Strategies of Plants  
ZOO\*3600 [0.50] Comparative Animal Physiology I

One of:

BOT\*3410 [0.50] Plant Anatomy  
ZOO\*2090 [0.50] Vertebrate Structure and Function

0.50 electives or restricted electives

**Note:** ZOO\*2700 may be substituted for BOT\*3410 or ZOO\*2090 and would be taken in semester 7.

**Semester 7 - Winter**

BIOL\*3060 [0.50] Populations, Communities & Ecosystems  
BIOL\*3130 [0.50] Conservation Biology  
ENVS\*4002 [0.50] Project in Environmental Sciences

1.00 electives or restricted electives

**Note:** See note in semester 6.

**Summer Semester (Optional)**

COOP\*4000 [0.00] Co-op Work Term IV

**Semester 8- Fall**

2.50 electives or restricted electives

**Restricted Electives**

Students are required to take 5.50 restricted credits in Ecology as noted below. Of these, at least 1.00 credits must be at the 4000 level.

1. A minimum of 0.50 credits from:

BIOL*4150	[0.50]	Wildlife Conservation and Management
CIS*1500	[0.50]	Introduction to Programming
GEOG*2420	[0.50]	The Earth From Space
GEOG*2480	[0.50]	Mapping and GIS
GEOG*3420	[0.50]	Remote Sensing of the Environment *
GEOG*3480	[0.50]	GIS and Spatial Analysis *
GEOG*4480	[1.00]	Applied Geomatics

\* Additional prerequisites are required.

2. Students in the Ecology Major are required to take an additional 5.00 restricted elective credits from the following lists. Some courses may require other courses from the list as prerequisites.

Ecology

ANSC*3180	[0.50]	Wildlife Nutrition
BIOL*3450	[0.50]	Introduction to Aquatic Environments
BOT*3050	[0.50]	Plant Functional Ecology
ENVS*2030	[0.50]	Meteorology and Climatology
ENVS*3010	[0.50]	Climate Change Biology
ENVS*3270	[0.50]	Forest Biodiversity
ENVS*3290	[0.50]	Waterborne Disease Ecology
ENVS*4350	[0.50]	Forest Ecology
GEOG*2000	[0.50]	Geomorphology
GEOG*2110	[0.50]	Climate and the Biophysical Environment
GEOG*3000	[0.50]	Fluvial Processes
GEOG*3610	[0.50]	Environmental Hydrology
NUTR*3210	[0.50]	Fundamentals of Nutrition
ZOO*4570	[0.50]	Marine Ecological Processes

Conservation

BIOL*4120	[0.50]	Evolutionary Ecology
BIOL*4150	[0.50]	Wildlife Conservation and Management
BIOL*4350	[0.50]	Limnology of Natural and Polluted Waters
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*2330	[0.50]	Current Issues in Ecosystem Science and Biodiversity
ENVS*3000	[0.50]	Nature Interpretation
ENVS*3010	[0.50]	Climate Change Biology
GEOG*2480	[0.50]	Mapping and GIS

GEOG*3020	[0.50]	Global Environmental Change
GEOG*3110	[0.50]	Biotic and Natural Resources
GEOG*3210	[0.50]	Management of the Biophysical Environment
GEOG*3480	[0.50]	GIS and Spatial Analysis
GEOG*4110	[1.00]	Environmental Systems Analysis
GEOG*4230	[0.50]	Environmental Impact Assessment
GEOG*4480	[1.00]	Applied Geomatics

Policy, Law and Management

BIOL*4500	[0.50]	Natural Resource Policy Analysis
ECON*2100	[0.50]	Economic Growth and Environmental Quality
FARE*2700	[0.50]	Survey of Natural Resource Economics
GEOG*2210	[0.50]	Environment and Resources
GEOG*4210	[0.50]	Environmental Governance
GEOG*4220	[0.50]	Local Environmental Management
PHIL*2070	[0.50]	Philosophy of the Environment
POLS*3370	[0.50]	Environmental Politics and Governance

Independent Research and Field Courses

BIOL*4410	[0.75]	Field Ecology
BIOL*4700	[0.50]	Field Biology
BIOL*4710	[0.25]	Field Biology
BIOL*4800	[0.50]	Field Biology
BIOL*4810	[0.25]	Field Biology
ENVS*3410	[0.50]	Independent Research I
ENVS*3420	[0.50]	Independent Research II
ENVS*3430	[1.00]	Independent Research
IBIO*4500	[0.75]	Research in Integrative Biology I
IBIO*4510	[0.75]	Research in Integrative Biology II
IBIO*4521	[1.00]	Thesis in Integrative Biology
IBIO*4522	[1.00]	Thesis in Integrative Biology
ZOO*4300	[0.75]	Marine Biology and Oceanography

**Credit Summary (20.00 Total Credits)**

7.00 credits - Environmental Sciences core

5.00 credits - Ecology Required courses

5.50 credits - Ecology Restricted electives

2.50 credits - Free electives

Students are reminded that 6.00 credits of their B.Sc. (Env.) degree must be at the 3000-4000 level.

Students are encouraged to seek advice on their choices from their faculty advisor. With prior approval, students may be able to use courses not on these lists towards their Ecology restrictive electives.

**Environmental Sciences (ENVS)****School of Environmental Sciences, Ontario Agricultural College**

This major combines a foundation in the breadth of environmental science while giving students practical experience in integrating the basic science in environmental problem solving. The integration of biophysical sciences with real-world applications provides students with a unique skill set for engaging with current and future environmental issues. The many opportunities in the major for experiential learning and independent research give students an ability to collect, analyze and interpret environmental data, and propose solutions that account for both the biophysical science and the socio-economic context. The second year core curriculum develops a cross-disciplinary understanding of the biophysical environment, while the third and fourth years allow students to engage more deeply with issues of interest to them. Students will graduate from this major ready to address diverse problems such as pollinator conservation, soil and water conservation, greenhouse gas mitigation, plant disease management and chemical movement in the environment. It provides a solid background for careers in environmental protection, resource management and research, in both the public and private sectors.

**Major****Semester 1**

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
ENVS*1030	[1.00]	Introduction to Environmental Sciences
MATH*1080	[0.50]	Elements of Calculus I

**Semester 2**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
FARE*1040	[1.00]	Intro to Environmental Economics, Law & Policy
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

**Semester 3**

ENVS*2030	[0.50]	Meteorology and Climatology
ENVS*2060	[0.50]	Soil Science
ENVS*2240	[0.50]	Fundamentals of Environmental Geology
ENVS*2310	[0.50]	Earth Surface Processes

0.50 restricted electives from List A or B

**Semester 4**

BIOL*2060	[0.50]	Ecology
ENVS*2080	[0.50]	Introduction to Environmental Microbiology
STAT*2040	[0.50]	Statistics I

0.50 restricted electives from List A or B

0.50 electives or restricted electives

**Semester 5**

One of:

ECON*2100	[0.50]	Economic Growth and Environmental Quality
FARE*2700	[0.50]	Survey of Natural Resource Economics
GEOG*3210	[0.50]	Management of the Biophysical Environment

2.00 electives or restricted electives

Students wishing to register in BIOL\*4350 must substitute BIOL\*3450 in Semester 5 for ENVS\*3150 in Semester 6.

**Semester 6**

ENVS*3150	[0.50]	Aquatic Systems
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2.00 electives or restricted electives

**Semester 7**

ENVS*4001	[0.50]	Project in Environmental Sciences
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2.00 electives or restricted electives

**Semester 8**

ENVS*4002	[0.50]	Project in Environmental Sciences
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2.00 electives or restricted electives

**Restricted Electives**

Students must take a total of 6.50 restricted elective credits as prescribed by the following lists.

Students must take 0.50 credits from each of List A & B

**List A**

One of:

ENVS*2330	[0.50]	Current Issues in Ecosystem Science and Biodiversity
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management

**List B**

One of:

PHYS*1080	[0.50]	Physics for Life Sciences
PHYS*1130	[0.50]	Physics with Applications
PHYS*1300	[0.50]	Fundamentals of Physics

Students lacking 4U Physics or equivalent must take PHYS\*1300.

Students are required to choose a minimum of 5.50 credits from Lists C, D, E, and F. Students must take a minimum of 1.50 credits from List C, a minimum of 1.00 credits from List D, and students may not count more than 1.00 credits from List F towards their restricted electives. Students should note that many restricted electives, particularly in List D, require other courses as prerequisites. Students should consult the most recent Undergraduate Calendar for specific requirements.

**List C**

Students must take a minimum of 1.50 credits from the following list:

BIOL*3130	[0.50]	Conservation Biology
CHEM*3360	[0.50]	Environmental Chemistry and Toxicology
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*2120	[0.50]	Introduction to Environmental Stewardship
ENVS*2210	[0.50]	Apiculture and Honey Bee Biology
ENVS*2230	[0.50]	Communications in Environmental Science
ENVS*3000	[0.50]	Nature Interpretation
ENVS*3010	[0.50]	Climate Change Biology
ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3030	[0.50]	Conservation Field Course
ENVS*3040	[0.50]	Natural Chemicals in the Environment
ENVS*3050	[0.50]	Microclimatology
ENVS*3060	[0.50]	Groundwater
ENVS*3080	[0.50]	Soil and Water Conservation
ENVS*3090	[0.50]	Insect Diversity and Biology
ENVS*3180	[0.50]	Sedimentary Environments
ENVS*3210	[0.50]	Plant Pathology
ENVS*3220	[0.50]	Terrestrial Chemistry
ENVS*3230	[0.50]	Agroforestry Systems
ENVS*3250	[0.50]	Forest Health and Disease
ENVS*3270	[0.50]	Forest Biodiversity
ENVS*3290	[0.50]	Waterborne Disease Ecology
ENVS*3310	[0.50]	Soil Biodiversity and Ecosystem Function
ENVS*3340	[0.50]	Use and Management of Environmental Data
ENVS*3370	[0.50]	Terrestrial Ecosystem Ecology
MICR*3220	[0.50]	Plant Microbiology
TOX*2000	[0.50]	Principles of Toxicology

**List D**

Students must take a minimum of 1.00 credits from the following list:

BIOL*4350	[0.50]	Limnology of Natural and Polluted Waters
ENVS*4070	[0.50]	Pollinator Conservation
ENVS*4090	[0.50]	Soil Management
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests
ENVS*4160	[0.50]	Soil and Nutrient Management
ENVS*4180	[0.50]	Insecticide Biological Activity and Resistance
ENVS*4190	[0.50]	Biological Activity of Herbicides
ENVS*4210	[0.50]	Meteorological and Environmental Instrumentation
ENVS*4230	[0.50]	Biology of Aquatic Insects
ENVS*4260	[0.50]	Field Entomology
ENVS*4320	[1.00]	Laboratory and Field Methods in Soil Biodiversity
ENVS*4350	[0.50]	Forest Ecology
ENVS*4360	[0.50]	Glacial Environments
ENVS*4370	[0.50]	Environmental Organic Chemistry
ENVS*4390	[1.00]	Soil Variability and Land Evaluation
PBIO*4530	[0.50]	Plants and Environmental Pollution

**List E**

ENVS*3100	[0.50]	Internship/Externship in Environmental Sciences
ENVS*3410	[0.50]	Independent Research I
ENVS*3420	[0.50]	Independent Research II
ENVS*3430	[1.00]	Independent Research
ENVS*3510	[0.50]	Independent Study I
ENVS*3520	[0.50]	Independent Study II
ENVS*3530	[1.00]	Independent Study
ENVS*4410	[1.00]	Advanced Independent Research I
ENVS*4420	[1.00]	Advanced Independent Research II
ENVS*4430	[2.00]	Advanced Independent Research
ENVS*4510	[0.50]	Advanced Independent Study I
ENVS*4520	[0.50]	Advanced Independent Study II
ENVS*4530	[1.00]	Advanced Independent Study

**List F**

Students may count up to 1.00 credits from the following list towards their 6.50 credit restricted electives.

GEOG*2420	[0.50]	The Earth From Space
GEOG*2480	[0.50]	Mapping and GIS
GEOG*3420	[0.50]	Remote Sensing of the Environment
GEOG*3480	[0.50]	GIS and Spatial Analysis

**Credit Summary (20.00 Total Credits)**

7.00 credits - Environmental Sciences core

4.50 credits - Required Courses for the Major

5.50 credits - Restricted Electives

3.00 credits - Free electives

Students are encouraged to seek advice from their faculty advisor and are reminded that 6.00 credits of their B.Sc.(Env.) degree must be at the 3000-4000 level. With prior approval, students may be able to use courses not on Lists C, D, E, or F toward their restricted electives

**Environmental Sciences (ENVS:C)****School of Environmental Sciences, Ontario Agricultural College**

This major combines a foundation in the breadth of environmental science while giving students practical experience in integrating the basic science in environmental problem solving. The integration of biophysical sciences with real-world applications provides students with a unique skill set for engaging with current and future environmental issues. The many opportunities in the major for experiential learning and independent research give students an ability to collect, analyze and interpret environmental data, and propose solutions that account for both the biophysical science and the socio-economic context. The second year core curriculum develops a cross-disciplinary understanding of the biophysical environment, while the third and fourth years allow students to engage more deeply with issues of interest to them. Students will graduate from this major ready to address diverse problems such as pollinator conservation, soil and water conservation, greenhouse gas mitigation, plant disease management and chemical movement in the environment. It provides a solid background for careers in environmental protection, resource management and research, in both the public and private sectors.

**Major****Semester 1 - Fall**

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
ENVS*1030	[1.00]	Introduction to Environmental Sciences
MATH*1080	[0.50]	Elements of Calculus I

**Semester 2 - Winter**

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
COOP*1100	[0.00]	Introduction to Co-operative Education



FARE*1040	[1.00]	Intro to Environmental Economics, Law & Policy
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

**Semester 3 - Fall**

ENVS*2030	[0.50]	Meteorology and Climatology
ENVS*2060	[0.50]	Soil Science
ENVS*2240	[0.50]	Fundamentals of Environmental Geology
ENVS*2310	[0.50]	Earth Surface Processes

0.50 restricted electives from List A or B

**Winter Semester**

COOP*1000	[0.00]	Co-op Work Term I
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**Semester 4 - Summer**

STAT*2040	[0.50]	Statistics I
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2.00 electives or restricted electives

**Fall Semester**

COOP*2000	[0.00]	Co-op Work Term II
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**Semester 5 - Winter**

BIOL*2060	[0.50]	Ecology
ENVS*2080	[0.50]	Introduction to Environmental Microbiology

0.50 restricted electives from List A or B

1.00 electives or restricted electives

**Summer Semester**

COOP*3000	[0.00]	Co-op Work Term III
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**Semester 6 - Fall**

ENVS*4001	[0.50]	Project in Environmental Sciences
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One of:

ECON*2100	[0.50]	Economic Growth and Environmental Quality
FARE*2700	[0.50]	Survey of Natural Resource Economics
GEOG*3210	[0.50]	Management of the Biophysical Environment

1.50 electives or restricted electives

Students wishing to register in BIOL\*4350 must substitute BIOL\*3450 in Semester 6 for ENVS\*3150 in Semester 7.

**Semester 7 - Winter**

ENVS*3150	[0.50]	Aquatic Systems
ENVS*4002	[0.50]	Project in Environmental Sciences

1.50 electives or restricted electives

**Summer Semester - (Optional)**

COOP*4000	[0.00]	Co-op Work Term IV
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**Semester 8 - Fall**

2.50 electives or restricted electives

**Restricted Electives**

Students must take a total of 6.50 restricted elective credits as prescribed by the following lists.

Students must take 0.50 credits from each of List A & B

**List A**

One of:

ENVS*2330	[0.50]	Current Issues in Ecosystem Science and Biodiversity
ENVS*2340	[0.50]	Current Issues in Agriculture and Landscape Management

**List B**

One of:

PHYS*1080	[0.50]	Physics for Life Sciences
PHYS*1130	[0.50]	Physics with Applications
PHYS*1300	[0.50]	Fundamentals of Physics

Students lacking 4U Physics or equivalent must take PHYS\*1300.

Students are required to choose a minimum of 5.50 credits from Lists C, D, E, and F. Students must take a minimum of 1.50 credits from List C, a minimum of 1.00 credits from List D, and students may not count more than 1.00 credits from List F towards their restricted electives. Students should note that many restricted electives, particularly in List D, require other courses as prerequisites. Students should consult the most recent Undergraduate Calendar for specific requirements.

**List C**

Students must take a minimum of 1.50 credits from the following list:

BIOL*3130	[0.50]	Conservation Biology
CHEM*3360	[0.50]	Environmental Chemistry and Toxicology
ENVS*2040	[0.50]	Plant Health and the Environment
ENVS*2120	[0.50]	Introduction to Environmental Stewardship
ENVS*2210	[0.50]	Apiculture and Honey Bee Biology
ENVS*2230	[0.50]	Communications in Environmental Science
ENVS*3000	[0.50]	Nature Interpretation
ENVS*3010	[0.50]	Climate Change Biology
ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3030	[0.50]	Conservation Field Course

ENVS*3040	[0.50]	Natural Chemicals in the Environment
ENVS*3050	[0.50]	Microclimatology
ENVS*3060	[0.50]	Groundwater
ENVS*3080	[0.50]	Soil and Water Conservation
ENVS*3090	[0.50]	Insect Diversity and Biology
ENVS*3180	[0.50]	Sedimentary Environments
ENVS*3210	[0.50]	Plant Pathology
ENVS*3220	[0.50]	Terrestrial Chemistry
ENVS*3230	[0.50]	Agroforestry Systems
ENVS*3250	[0.50]	Forest Health and Disease
ENVS*3270	[0.50]	Forest Biodiversity
ENVS*3290	[0.50]	Waterborne Disease Ecology
ENVS*3310	[0.50]	Soil Biodiversity and Ecosystem Function
ENVS*3340	[0.50]	Use and Management of Environmental Data
ENVS*3370	[0.50]	Terrestrial Ecosystem Ecology
MICR*3220	[0.50]	Plant Microbiology
TOX*2000	[0.50]	Principles of Toxicology

**List D**

Students must take a minimum of 1.00 credits from the following list:

BIOL*4350	[0.50]	Limnology of Natural and Polluted Waters
ENVS*4070	[0.50]	Pollinator Conservation
ENVS*4090	[0.50]	Soil Management
ENVS*4100	[0.50]	Integrated Management of Invasive Insect Pests
ENVS*4160	[0.50]	Soil and Nutrient Management
ENVS*4180	[0.50]	Insecticide Biological Activity and Resistance
ENVS*4190	[0.50]	Biological Activity of Herbicides
ENVS*4210	[0.50]	Meteorological and Environmental Instrumentation
ENVS*4230	[0.50]	Biology of Aquatic Insects
ENVS*4260	[0.50]	Field Entomology
ENVS*4320	[1.00]	Laboratory and Field Methods in Soil Biodiversity
ENVS*4350	[0.50]	Forest Ecology
ENVS*4360	[0.50]	Glacial Environments
ENVS*4370	[0.50]	Environmental Organic Chemistry
ENVS*4390	[1.00]	Soil Variability and Land Evaluation
PBIO*4530	[0.50]	Plants and Environmental Pollution

**List E**

ENVS*3100	[0.50]	Internship/Externship in Environmental Sciences
ENVS*3410	[0.50]	Independent Research I
ENVS*3420	[0.50]	Independent Research II
ENVS*3430	[1.00]	Independent Research
ENVS*3510	[0.50]	Independent Study I
ENVS*3520	[0.50]	Independent Study II
ENVS*3530	[1.00]	Independent Study
ENVS*4410	[1.00]	Advanced Independent Research I
ENVS*4420	[1.00]	Advanced Independent Research II
ENVS*4430	[2.00]	Advanced Independent Research
ENVS*4510	[0.50]	Advanced Independent Study I
ENVS*4520	[0.50]	Advanced Independent Study II
ENVS*4530	[1.00]	Advanced Independent Study

**List F**

Students may count up to 1.00 credits from the following list towards their 6.50 credit restricted electives.

GEOG*2420	[0.50]	The Earth From Space
GEOG*2480	[0.50]	Mapping and GIS
GEOG*3420	[0.50]	Remote Sensing of the Environment
GEOG*3480	[0.50]	GIS and Spatial Analysis

**Credit Summary (20.00 Total Credits)**

7.00 credits - Environmental Sciences core
4.50 credits - Required Courses for the Major
5.50 credits - Restricted Electives
3.00 credits - Free electives

Students are encouraged to seek advice from their faculty advisor and are reminded that 6.00 credits of their B.Sc.(Env.) degree must be at the 3000-4000 level. With prior approval, students may be able to use courses not on Lists C, D, E or F toward their restricted electives

**Environmental Economics and Policy (EEP)**

**Department of Food, Agricultural and Resource Economics, Ontario Agricultural College**

This major provides the foundation for applying science and economics to environmental issues to produce effective environmental policy. Students gain an understanding of the policy tools and market mechanisms for managing our natural resources effectively. Knowledge and skills learned in this major will enable students to identify, prioritize and solve environmental problems by integrating both scientific and economic theories and data. Equipped with the ability to look at current topics from the perspectives of economics, politics and environmental sciences, students have a number of interesting career opportunities in the public, private and NGO sectors. At the same time, the major fully prepares students to move onto professional and research graduate programs.

## Major

### Semester 1

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
ENVS*1030	[1.00]	Introduction to Environmental Sciences
MATH*1080	[0.50]	Elements of Calculus I

### Semester 2

BIOL*1090	[0.50]	Introduction to Molecular and Cellular Biology
CHEM*1050	[0.50]	General Chemistry II
FARE*1040	[1.00]	Intro to Environmental Economics, Law & Policy
GEOG*1300	[0.50]	Introduction to the Biophysical Environment

### Semester 3

ECON*1100	[0.50]	Introductory Macroeconomics
FARE*2700	[0.50]	Survey of Natural Resource Economics

1.50 electives or restricted electives

### Semester 4

ECON*2310	[0.50]	Intermediate Microeconomics
ECON*2410	[0.50]	Intermediate Macroeconomics
ECON*2770	[0.50]	Introductory Mathematical Economics

One of:

ECON*2740	[0.50]	Economic Statistics
STAT*2040	[0.50]	Statistics I

0.50 electives or restricted electives

**Note:** Students interested in the Statistics and Environmental Risk Assessment sequence in their restricted electives should choose STAT\*2040 to satisfy the statistics requirement in the ENVS core.

### Semester 5

ECON*2100	[0.50]	Economic Growth and Environmental Quality
ECON*3740	[0.50]	Introduction to Econometrics

1.50 electives or restricted electives

### Semester 6

FARE*3170	[0.50]	Cost-Benefit Analysis
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2.00 electives or restricted electives

### Semester 7

ECON*4930	[0.50]	Environmental Economics
ENVS*4001	[0.50]	Project in Environmental Sciences
FARE*4290	[0.50]	Land Economics

1.00 electives or restricted electives

### Semester 8

ENVS*4002	[0.50]	Project in Environmental Sciences
FARE*4310	[0.50]	Resource Economics

1.50 restricted electives or electives

### Restricted Electives

Students in the Environmental Economics and Policy major are required to complete 6.00 credits in restricted electives. 2.50 restricted elective credits must be in FARE or ECON courses at the 3000 or 4000 level.

Courses in the following lists may be taken to satisfy the restricted electives requirement. Courses are grouped to assist students select programs of study aimed at different educational and career paths.

#### List A

Students must select a minimum of 2.50 credits from the following lists:

#### 1. Quantitative Methods, Research and Graduate Studies

ECON*3100	[0.50]	Game Theory
ECON*3710	[0.50]	Advanced Microeconomics
ECON*4640	[0.50]	Applied Econometrics I
ECON*4700	[0.50]	Advanced Mathematical Economics
ECON*4710	[0.50]	Advanced Topics in Microeconomics
ECON*4750	[0.50]	Topics in Public Economics
ECON*4840	[0.50]	Applied Econometrics II
FARE*4500	[0.50]	Decision Science
FARE*4550	[0.50]	Independent Studies I
FARE*4560	[0.50]	Independent Studies II

#### 2. Policy Analysis

ECON*2650	[0.50]	Introductory Development Economics
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ECON*3500	[0.50]	Urban Economics
ECON*3580	[0.50]	Economics of Regulation
ECON*3610	[0.50]	Public Economics
ECON*3620	[0.50]	International Trade
ECON*4830	[0.50]	Economic Development
ECON*4880	[0.50]	Topics in International Economics
EDRD*2650	[0.50]	Introduction to Planning and Environmental Law
FARE*2410	[0.50]	Agri-food Markets and Policy
FARE*3250	[0.50]	Food and International Development
FARE*4000	[0.50]	Agricultural and Food Policy
FARE*4210	[0.50]	World Agriculture, Food Security and Economic Development
FARE*4550	[0.50]	Independent Studies I
FARE*4560	[0.50]	Independent Studies II
POLS*3370	[0.50]	Environmental Politics and Governance

#### List B

Students must select a minimum of 1.00 credits from the following lists:

#### 1. Remote Sensing, Geographical Information Systems and Spatial Analysis

GEOG*2420	[0.50]	The Earth From Space
GEOG*2480	[0.50]	Mapping and GIS
GEOG*3420	[0.50]	Remote Sensing of the Environment
GEOG*3480	[0.50]	GIS and Spatial Analysis
GEOG*4480	[1.00]	Applied Geomatics

#### 2. Statistics and Environmental Risk Assessment

STAT*2050	[0.50]	Statistics II
STAT*3510	[0.50]	Environmental Risk Assessment

**Note:** Students interested in this sequence should take STAT\*2040 rather than ECON\*2740 to satisfy the statistics requirement in the ENVS core.

#### 3. Earth Sciences

ENVS*2030	[0.50]	Meteorology and Climatology
ENVS*2060	[0.50]	Soil Science
ENVS*2310	[0.50]	Earth Surface Processes
ENVS*3060	[0.50]	Groundwater

#### 4. Ecology and Conservation Biology

BIOL*2060	[0.50]	Ecology
BIOL*3060	[0.50]	Populations, Communities & Ecosystems
BIOL*3130	[0.50]	Conservation Biology
BIOL*4150	[0.50]	Wildlife Conservation and Management
BIOL*4500	[0.50]	Natural Resource Policy Analysis
ENVS*2330	[0.50]	Current Issues in Ecosystem Science and Biodiversity

#### 5. Toxicology and Environmental Chemistry

ENVS*3020	[0.50]	Pesticides and the Environment
ENVS*3040	[0.50]	Natural Chemicals in the Environment
ENVS*3220	[0.50]	Terrestrial Chemistry
TOX*2000	[0.50]	Principles of Toxicology
TOX*3360	[0.50]	Environmental Chemistry and Toxicology

### Credit Summary (20.00 Total Credits)

7.00 credits - Environmental Sciences core

5.00 credits - Environmental Economics and Policy required courses

6.00 credits - Environmental Economics and Policy restricted electives

2.00 credits - Free electives

Students are encouraged to seek advice on their choices from their faculty advisor. Students are reminded that 6.00 credits of their B.Sc. (Env.) degree must be at the 3000 or 4000 level.

## Environmental Economics and Policy (EEP:C)

### Department of Food, Agricultural and Resource Economics, Ontario Agricultural College

This major provides the foundation for applying science and economics to environmental issues to produce effective environmental policy. Students gain an understanding of the policy tools and market mechanisms for managing our natural resources effectively. Knowledge and skills learned in this major will enable students to identify, prioritize and solve environmental problems by integrating both scientific and economic theories and data. Equipped with the ability to look at current topics from the perspectives of economics, politics and environmental sciences, students have a number of interesting career opportunities in the public, private and NGO sectors. At the same time, the major fully prepares students to move onto professional and research graduate programs.

## Major

### Semester 1 - Fall

BIOL*1070	[0.50]	Discovering Biodiversity
CHEM*1040	[0.50]	General Chemistry I
ENVS*1030	[1.00]	Introduction to Environmental Sciences

MATH\*1080 [0.50] Elements of Calculus I

**Semester 2 - Winter**

BIOL\*1090 [0.50] Introduction to Molecular and Cellular Biology  
 CHEM\*1050 [0.50] General Chemistry II  
 COOP\*1100 [0.00] Introduction to Co-operative Education  
 FARE\*1040 [1.00] Intro to Environmental Economics, Law & Policy  
 GEOG\*1300 [0.50] Introduction to the Biophysical Environment

**Semester 3 - Fall**

ECON\*1100 [0.50] Introductory Macroeconomics  
 FARE\*2700 [0.50] Survey of Natural Resource Economics

1.50 electives or restricted electives

**Winter Semester**

COOP\*1000 [0.00] Co-op Work Term I

**Semester 4 - Summer**

ECON\*2310 [0.50] Intermediate Microeconomics  
 ECON\*2410 [0.50] Intermediate Macroeconomics  
 ECON\*2770 [0.50] Introductory Mathematical Economics

One of:

ECON\*2740 [0.50] Economic Statistics  
 STAT\*2040 [0.50] Statistics I

0.50 electives or restricted electives

**Note:** Students interested in the Statistics and Environmental Risk Assessment sequence in their restricted electives should choose STAT\*2040 to satisfy the statistics requirement in the ENVS core. ECON\*2740 may not be offered in the summer semester, so STAT\*2040 should be taken if students wish to satisfy this program requirement in the summer semester.

**Fall Semester**

COOP\*2000 [0.00] Co-op Work Term II

**Semester 5 - Winter**

ECON\*3740 [0.50] Introduction to Econometrics  
 FARE\*3170 [0.50] Cost-Benefit Analysis

1.50 electives or restricted electives

**Summer Semester**

COOP\*3000 [0.00] Co-op Work Term III

**Semester 6 - Fall**

ECON\*2100 [0.50] Economic Growth and Environmental Quality  
 ENVS\*4001 [0.50] Project in Environmental Sciences

1.50 electives or restricted electives

**Semester 7 - Winter**

ENVS\*4002 [0.50] Project in Environmental Sciences  
 FARE\*4310 [0.50] Resource Economics

1.50 electives or restricted electives

**Summer Semester (Optional)**

COOP\*4000 [0.00] Co-op Work Term IV

**Semester 8 - Fall**

ECON\*4930 [0.50] Environmental Economics  
 FARE\*4290 [0.50] Land Economics

1.50 electives or restricted electives

**Restricted Electives**

Students in the Environmental Economics and Policy major are required to complete 6.00 credits in restricted electives. 2.50 restricted elective credits must be in FARE or ECON courses at the 3000 or 4000 level.

Courses in the following lists may be taken to satisfy the restricted electives requirement. Courses are grouped to assist students select programs of study aimed at different educational and career paths.

**List A**

Students must select a minimum of 2.50 credits from the following lists:

**1. Quantitative Methods, Research and Graduate Studies**

ECON\*3100 [0.50] Game Theory  
 ECON\*3710 [0.50] Advanced Microeconomics  
 ECON\*4640 [0.50] Applied Econometrics I  
 ECON\*4700 [0.50] Advanced Mathematical Economics  
 ECON\*4710 [0.50] Advanced Topics in Microeconomics  
 ECON\*4750 [0.50] Topics in Public Economics  
 ECON\*4840 [0.50] Applied Econometrics II  
 FARE\*4500 [0.50] Decision Science  
 FARE\*4550 [0.50] Independent Studies I  
 FARE\*4560 [0.50] Independent Studies II

**2. Policy Analysis**

ECON\*2650 [0.50] Introductory Development Economics  
 ECON\*3500 [0.50] Urban Economics  
 ECON\*3580 [0.50] Economics of Regulation

ECON\*3610 [0.50] Public Economics  
 ECON\*3620 [0.50] International Trade  
 ECON\*4830 [0.50] Economic Development  
 ECON\*4880 [0.50] Topics in International Economics  
 EDRD\*2650 [0.50] Introduction to Planning and Environmental Law  
 FARE\*2410 [0.50] Agrifood Markets and Policy  
 FARE\*3250 [0.50] Food and International Development  
 FARE\*4000 [0.50] Agricultural and Food Policy  
 FARE\*4210 [0.50] World Agriculture, Food Security and Economic Development  
 FARE\*4550 [0.50] Independent Studies I  
 FARE\*4560 [0.50] Independent Studies II  
 POLS\*3370 [0.50] Environmental Politics and Governance

**List B**

Students must select a minimum of 1.00 credits from the following lists:

**1. Remote Sensing, Geographical Information Systems and Spatial Analysis**

GEOG\*2420 [0.50] The Earth From Space  
 GEOG\*2480 [0.50] Mapping and GIS  
 GEOG\*3420 [0.50] Remote Sensing of the Environment  
 GEOG\*3480 [0.50] GIS and Spatial Analysis  
 GEOG\*4480 [1.00] Applied Geomatics

**2. Statistics and Environmental Risk Assessment**

STAT\*2050 [0.50] Statistics II  
 STAT\*3510 [0.50] Environmental Risk Assessment

**Note:** Students interested in this sequence should take STAT\*2040 rather than ECON\*2740 to satisfy the statistics requirement in the ENVS core.

**3. Earth Sciences**

ENVS\*2030 [0.50] Meteorology and Climatology  
 ENVS\*2060 [0.50] Soil Science  
 ENVS\*2310 [0.50] Earth Surface Processes  
 ENVS\*3060 [0.50] Groundwater

**4. Ecology and Conservation Biology**

BIOL\*2060 [0.50] Ecology  
 BIOL\*3060 [0.50] Populations, Communities & Ecosystems  
 BIOL\*3130 [0.50] Conservation Biology  
 BIOL\*4150 [0.50] Wildlife Conservation and Management  
 BIOL\*4500 [0.50] Natural Resource Policy Analysis  
 ENVS\*2330 [0.50] Current Issues in Ecosystem Science and Biodiversity

**5. Toxicology and Environmental Chemistry**

ENVS\*3020 [0.50] Pesticides and the Environment  
 ENVS\*3040 [0.50] Natural Chemicals in the Environment  
 ENVS\*3220 [0.50] Terrestrial Chemistry  
 TOX\*2000 [0.50] Principles of Toxicology  
 TOX\*3360 [0.50] Environmental Chemistry and Toxicology

**Credit Summary (20.00 Total Credits)**

7.00 credits - Environmental Sciences core  
 5.00 credits - Environmental Economics and Policy required courses  
 6.00 credits - Environmental Economics and Policy restricted electives  
 2.00 credits - Free electives

Students are reminded that 6.00 credits of their B.Sc. (Env.) degree must be at the 3000-4000 level.

**Environment and Resource Management (ERM)****Department of Geography, College of Social and Applied Human Sciences**

The major focuses on environmental interactions and problem solving by developing an integrated biophysical environment - human environment perspective. In ERM, students will gain knowledge across the natural sciences, an understanding of how they interact, the skills (tools and techniques) needed to support decision making, as well as the methods of management and governance that are critical for environmental decision making. Beginning in first year students learn in the classroom and through hands-on work in labs and in the field. Students are expected to design and conduct experiments and problem solve using state-of-the-art computing and analytical tools. This major provides the knowledge, skills and methods an environmental scientist requires as environmental consultant, environmental manager, environmental and/or resource planner, geographic information systems analyst or to facilitate future graduate work.

**Major****Semester 1**

BIOL\*1070 [0.50] Discovering Biodiversity  
 CHEM\*1040 [0.50] General Chemistry I  
 ENVS\*1030 [1.00] Introduction to Environmental Sciences  
 MATH\*1080 [0.50] Elements of Calculus I

<b>Semester 2</b>			MATH*1080 [0.50] Elements of Calculus I
BIOL*1090 [0.50]	Introduction to Molecular and Cellular Biology		<b>Semester 2 - Winter</b>
CHEM*1050 [0.50]	General Chemistry II		BIOL*1090 [0.50] Introduction to Molecular and Cellular Biology
FARE*1040 [1.00]	Intro to Environmental Economics, Law & Policy		CHEM*1050 [0.50] General Chemistry II
GEOG*1300 [0.50]	Introduction to the Biophysical Environment		COOP*1100 [0.00] Introduction to Co-operative Education
<b>Semester 3</b>			FARE*1040 [1.00] Intro to Environmental Economics, Law & Policy
GEOG*2000 [0.50]	Geomorphology		GEOG*1300 [0.50] Introduction to the Biophysical Environment
GEOG*2460 [0.50]	Analysis in Geography		<b>Semester 3 - Fall</b>
One of:			GEOG*2000 [0.50] Geomorphology
ECON*2100 [0.50]	Economic Growth and Environmental Quality		GEOG*2480 [0.50] Mapping and GIS
FARE*2700 [0.50]	Survey of Natural Resource Economics		1.50 electives or restricted electives
1.00 electives			<b>Note:</b> FARE*2700 may be substituted for ECON*2100 and may be taken in Semester 3 or 6, GEOG*2460 may be substituted for STAT*2040 and may be taken in Semester 3 or 6.
<b>Semester 4</b>			<b>Note:</b> ENVS*2120 may be substituted for ENVS*2340 and could be taken in Semester 3 or 6.
ENVS*2340 [0.50]	Current Issues in Agriculture and Landscape Management		<b>Winter Semester</b>
GEOG*2110 [0.50]	Climate and the Biophysical Environment		COOP*1000 [0.00] Co-op Work Term I
GEOG*2210 [0.50]	Environment and Resources		<b>Semester 4 - Summer</b>
GEOG*2480 [0.50]	Mapping and GIS		ECON*2100 [0.50] Economic Growth and Environmental Quality
0.50 electives or restricted electives			GEOG*2210 [0.50] Environment and Resources
<b>Note:</b> ENVS*2120 may be substituted for ENVS*2340 and could be taken in Semester 5.			STAT*2040 [0.50] Statistics I
<b>Semester 5</b>			1.00 electives or restricted electives
GEOG*3000 [0.50]	Fluvial Processes		<b>Fall Semester</b>
GEOG*3110 [0.50]	Biotic and Natural Resources		COOP*2000 [0.00] Co-op Work Term II
GEOG*3210 [0.50]	Management of the Biophysical Environment		<b>Semester 5 - Winter</b>
1.00 electives or restricted electives			ENVS*2340 [0.50] Current Issues in Agriculture and Landscape Management
<b>Note:</b> GEOG*3610 may be substituted for GEOG*3000 and would be taken in Semester 6.			GEOG*2110 [0.50] Climate and the Biophysical Environment
<b>Semester 6</b>			GEOG*3480 [0.50] GIS and Spatial Analysis
GEOG*3480 [0.50]	GIS and Spatial Analysis		1.00 electives or restricted electives
2.00 electives or restricted electives			<b>Summer Semester</b>
<b>Semester 7</b>			COOP*3000 [0.00] Co-op Work Term III
ENVS*4001 [0.50]	Project in Environmental Sciences		<b>Semester 6 - Fall</b>
GEOG*4110 [1.00]	Environmental Systems Analysis		ENVS*4001 [0.50] Project in Environmental Sciences
GEOG*4210 [0.50]	Environmental Governance		GEOG*3000 [0.50] Fluvial Processes
0.50 electives or restricted electives			GEOG*3110 [0.50] Biotic and Natural Resources
<b>Semester 8</b>			GEOG*3210 [0.50] Management of the Biophysical Environment
ENVS*4002 [0.50]	Project in Environmental Sciences		0.50 electives or restricted electives
2.00 electives or restricted electives			<b>Note:</b> GEOG*3610 may be substituted for GEOG*3000 and would be taken in Semester 6.
<b>Restricted Electives</b>			<b>Semester 7 - Winter</b>
1. A minimum of 2 of the following courses:			ENVS*4002 [0.50] Project in Environmental Sciences
ENVS*4390 [1.00] Soil Variability and Land Evaluation			1.50 electives or restricted electives
GEOG*4220 [0.50] Local Environmental Management			<b>Summer Semester (Optional)</b>
GEOG*4230 [0.50] Environmental Impact Assessment			COOP*4000 [0.00] Co-op Work Term IV
2. An additional 1.00 credits in Geography (GEOG) at the 3000 level or higher.			<b>Semester 8 - Fall</b>
<b>Credit Summary (20.00 Total Credits)</b>			GEOG*4110 [1.00] Environmental Systems Analysis
7.00 credits - Environmental Sciences core			GEOG*4210 [0.50] Environmental Governance
6.00 credits - Environment and Resource Management Required courses			1.00 electives or restricted electives
2.00 - 2.50 credits - Environment and Resource Management Restricted electives, depending on course selection			<b>Restricted Electives</b>
4.00 - 4.50 credits - Free electives, depending on course selection			1. A minimum of 2 of the following courses:
Students are reminded that 6.00 credits of their B.Sc. (Env.) degree must be at the 3000-4000 level.			ENVS*4390 [1.00] Soil Variability and Land Evaluation
Students are encouraged to seek advice on their choices from their faculty advisor.			GEOG*4220 [0.50] Local Environmental Management
<b>Environment and Resource Management (ERM:C)</b>			GEOG*4230 [0.50] Environmental Impact Assessment
<b>Department of Geography, College of Social and Applied Human Sciences</b>			2. An additional 1.00 credits in Geography (GEOG) at the 3000 level or higher.
The major focuses on environmental interactions and problem solving by developing an integrated biophysical environment - human environment perspective. In ERM, students will gain knowledge across the natural sciences, an understanding of how they interact, the skills (tools and techniques) needed to support decision making, as well as the methods of management and governance that are critical for environmental decision making. Beginning in first year students learn in the classroom and through hands-on work in labs and in the field. Students are expected to design and conduct experiments and problem solve using state-of-the-art computing and analytical tools. This major provides the knowledge, skills and methods an environmental scientist requires as environmental consultant, environmental manager, environmental and/or resource planner, geographic information systems analyst or to facilitate future graduate work.			<b>Credit Summary (20.00 Total Credits)</b>
<b>Major</b>			7.00 credits - Environmental Sciences core
<b>Semester 1 - Fall</b>			6.00 credits - Environment and Resource Management Required courses
BIOL*1070 [0.50] Discovering Biodiversity			2.00 - 2.50 credits - Environment and Resource Management Restricted electives, depending on course selection
CHEM*1040 [0.50] General Chemistry I			4.00 - 4.50 credits - Free electives, depending on course selection
ENVS*1030 [1.00] Introduction to Environmental Sciences			Students are reminded that 6.00 credits of their B.Sc. (Env.) degree must be at the 3000-4000 level.
			Students are encouraged to seek advice on their choices from their faculty advisor.

## Doctor of Veterinary Medicine (D.V.M.)

### Program Information

The University of Guelph offers the degree program Doctor of Veterinary Medicine (D.V.M.) at the [Ontario Veterinary College](#). The program is offered during the Fall and Winter semesters only and normally requires four years to complete. The college is accredited jointly by the [Canadian](#) and [American Veterinary Medical Association](#), and the [Royal College of Veterinary Surgeons of Britain](#). The D.V.M. degree from Guelph is respected by veterinarians throughout the world.

### Objectives of the Program

1. The graduates should have the knowledge and skills appropriate to their career orientations and sufficient to allow the pursuit of a variety of careers in veterinary medicine, including graduate studies. They should be able to pass the examinations of all Canadian licensing bodies and must possess a fundamental core of academic veterinary science knowledge and of technical competence.
2. The graduates must be able to solve animal health problems and must have knowledge of the management of domestic animals and the functioning of the various animal industries.
3. The graduates must be able to communicate effectively, whether writing scientific papers or conversing with clients.
4. Through a commitment to continuing education, the graduates must accept the professional responsibility to stay abreast of new developments and to pursue solutions to new problems.
5. The graduates must have a genuine concern for the welfare of all animals. The graduates should be aware of their responsibilities to the profession in terms of ethical and professional conduct and have an understanding of the moral questions facing veterinarians.
6. The graduates must have had the opportunity during their university tenure to develop a range of non-veterinary interests sufficient to equip them to take a responsible role in society.

### Regulations for Licence to Practise

Graduates are eligible to practise in Canada, but the degree in veterinary medicine does not in itself confer the right to practise. For information on matters relative to licence to practise in the various provinces of Canada, students should communicate with the [Canadian Veterinary Medical Association](#), 339 Booth Street, Ottawa, Ontario, Canada K1R 7K1, who will refer them to the appropriate provincial veterinary association.

### Admission to the Veterinary Medicine Program

Complete details on admission requirements and procedures are listed in Section IV--Admission Information. Additional information may be found at: <http://www.ovc.uoguelph.ca/recruitment/en/index.asp>

### Academic Counselling

The Office of the Associate Dean, Students provides academic counselling and referral to other appropriate resources for all D.V.M. students. In particular, students who are requesting a Supplemental Privilege are required to meet with the Associate Dean so that the student can be informed of appropriate resources (such as Learning and Writing Services and the Counselling and Student Resource Centre) and use them to deal with his or her academic difficulties.

### Conditions for Continuation of Study

For supplemental and deferred privileges, all students in the D.V.M. Program are subject to Deferred Privilege Procedures and Supplemental Privilege Procedures outlined in Chapter VIII--Undergraduate Degree Regulations and Procedures.

For continuation of study, a student must satisfy the conditions presented below. In order to graduate, students must fulfill the course requirements for the program and have achieved at least a 60% Program Average (PA). The Academic Review Sub-Committee will assess all cases where a student's academic progress does not meet the Continuation of Study requirements and will interpret the academic regulations. The requirements will be applied with due consideration to the credit weights of the course, the role of the course in the Phase and the degree of integration of the course with concurrently required, and in light of the student's particular circumstances (see VIII--Undergraduate Degree Regulations and Procedures).

### Full-time Study

The D.V.M. program is offered as a full-time program and normally requires four years (over the equivalent of eight academic semesters at the University of Guelph) to complete. In exceptional extenuating circumstances, the Academic Review Sub-Committee may allow a student to take courses on a part-time basis. In these instances, the Academic Review Sub-Committee has the discretion to select the courses that the student will register in on a part-time basis. Students permitted to take courses on a part-time basis are cautioned that there is an enrolment limitation for the program and that access to certain courses or resumption of the program on a full-time basis will be conditional on the availability of space.

### Failed Courses

1. Continuation of study from one phase of the D.V.M. Program to the next is dependent on the successful completion of all courses, or approved equivalents, in the published schedule of studies for the D.V.M. Program.
2. A student who fails one course in a Phase may be required to repeat all courses in the Phase. The consequences of failure of any particular course in the D.V.M. Program are as follows:
  - a. Failure in any of the following courses result in the **Repeat of the Course**: VETM\*3210, VETM\*3390, VETM\*3430, VETM\*3220, VETM\*3440, VETM\*3510, VETM\*4220, VETM\*4450, VETM\*4530, VETM\*4610, VETM\*4660, VETM\*4710, VETM\*4870, VETM\*4900, VETM\*4920.
  - b. Failure in any of the following courses result in the **Repeat of the Phase**: VETM\*3070, VETM\*3080, VETM\*3120, VETM\*3400, VETM\*3410, VETM\*3450, VETM\*3460, VETM\*3470, VETM\*4460, VETM\*4470, VETM\*4480, VETM\*4490, VETM\*4540.

This information is also available as part of the Phase Handbooks.

3. A student will be allowed to fail a particular course only once. Any student who fails the same course twice will be required to withdraw and will be ineligible for readmission to the D.V.M. Program.
4. Grades obtained by D.V.M. students who repeat one or more VETM course(s) will be reported on the transcript in addition to the original course grade. In the instance where all courses in a Phase are repeated, the grades from the repeated VETM courses will constitute the new Phase Average (PHA). The new D.V.M. Program Average will include the grades obtained in both the original and repeated VETM course attempts.

### Supplemental Privileges

1. In the circumstances of a failed course, the Academic Review Sub-Committee may, if appropriate and under special circumstances only, allow a student the opportunity to gain credit standing in a failed course by granting a supplemental privilege (see Failed Courses and Supplemental Privilege in Section VIII). Students must request a supplemental privilege by submitting the request to the Academic Review Sub-Committee, and the fee for the privilege, within 7 days of the release of grades for the phase in which the failure occurred. The Academic Review Sub-Committee, upon receiving a request from a student, and after consulting with the instructor and reviewing the student's course performance, will determine whether a supplemental privilege should be granted.
2. Students will be permitted supplemental privileges in a maximum of two courses over the entire D.V.M. Program. A supplemental privilege will not be granted for a second failure in a course. Any student granted a supplemental privilege must meet with the Associate Dean for Student Affairs who will inform the student of appropriate resources to be used to deal with his/her academic difficulties.

### Conditions for Graduation

In order to qualify for graduation from the D.V.M. program, the student must have completed successfully all of the courses approved for the program. Students will not be allowed to graduate with a PA of < 60% or PHA of < 60% in Phase 4.

### Voluntary Withdrawal from the Program

Students who have voluntarily withdrawn from the D.V.M. program and who wish to return must give notice to the Associate Dean, Students O.V.C of their intention to return by May 31 if they wish to return in September of the upcoming academic year. Students contemplating a withdrawal from the program are cautioned that there is an enrolment limitation for the program and that re-entry will be conditional on the availability of space. The Program Committee reserves the right to select the quota from among the qualified applicants.

### Estimate of Expenses

Attention is drawn to Section VI--Schedule of Fees for information on tuition, University student organizations and rabies immunization required for all students in the program. In addition, while the college supplies most laboratory equipment, students may wish to purchase instruments for personal use. Texts, protective clothing, and a minimum of supplies for personal use may cost approximately \$500 per semester.

### Health and Safety

Students must follow the health and safety policies required for the various courses in the veterinary program. Pregnant students and others with increased medical risks should consult Health Services concerning potential health risks which may occur during the normal course of their studies.

*Immunization against rabies is a requirement for admission and continuation in the D.V.M. Program. Annual rabies titres and booster immunizations (if necessary) are mandatory for all Program participants. Prospective students and in-course students should contact Student Health Services (519-824-4120 extension 52131) for further information and guidance about the rabies surveillance program. Faculty and staff members should contact Occupational Health Services, extension 52133, for information about medical surveillance programs provided in accordance with University Safety Policy 851.13.03.*

**Schedule 5 (D.V.M. Continuation of Study)**

Continuation of Study is assessed on the student's D.V.M. Program Average (not the University Cumulative Average) and according to the policy on failures as stated above.

In Phase 2 and beyond, eligibility to continue is also assessed at the end of each Phase using the Phase Average (PHA). Courses that are given a grade of Pass or Fail do not affect either the PA or PHA because they are not attached to any numerical grade.

Students required to repeat a Phase must achieve the required PA of greater than or equal to 60% by the end of the repeated Phase. If a student does not achieve the required standing by the end of the repeated Phase, he or she will normally be required to withdraw from the program.

**The required averages are as follows:**

**For Course Attempts in Phase I**

Continuation of Study Assessment for DVM Students in Phase 1

Program Average (PA)	Status of Student
PA < 50%	Required to Withdraw
PA ≥ 50% but < 60%	Required to Repeat Phase
PA ≥ 60%	Eligible to Continue

**For Course Attempts in Phase 2 and Phase 3**

Continuation of Study Assessment for DVM Students in Phase 2 and Phase 3

Program Average (PA) and Phase Average (PHA)	Status of Student
PHA < 50%	Required to Withdraw
PA or PHA ≥ 50% but < 60%	Required to Repeat Phase*
PA and PHA ≥ 60%	Eligible to Continue

\* Students required to repeat Phase 3 will not be permitted to proceed to the Externship course prior to Phase 4.

**If Repeating Phase 1, 2, or 3**

Continuation of Study Assessment for DVM Students Repeating Phase 1, 2 or 3

Program Average (PA)	Status of Student
PA < 60%	Required to Withdraw
PA ≥ 60%	Eligible to Continue

**For Course Attempts in Phase 4**

Continuation of Study Assessment for DVM Students in Phase 4

Program Average (PA) and Phase Average (PHA)	Status of Student
PHA < 50%	Required to Withdraw
PA or PHA ≥ 50% but < 60%	Required to Remediate**
PA and PHA ≥ 60%	Eligible to Continue***

\*\* Students finishing Phase 4 with a PA or PHA > 50% but < 60%, will not be permitted to graduate. The Academic Review Sub-Committee will establish the appropriate remediation requirements that must be fulfilled in order for the student to obtain the standing of Eligible to Graduate. These may include repeating a component of a course, one or more entire courses, or one or more clinical rotations.

\*\*\* Students finishing Phase 4 with a PA and PHA ≥ 60% and having satisfied all course requirements for the program are Eligible to Graduate.

**Schedule of Studies****Phase 1**

VETM*3070	[2.00]	Veterinary Anatomy
VETM*3080	[2.00]	Veterinary Physiology and Biochemistry
VETM*3120	[0.75]	Veterinary Histology and General Pathology
VETM*3210	[0.50]	Art of Veterinary Medicine I
VETM*3390	[0.50]	Developmental Biology
VETM*3400	[0.75]	Health Management I
VETM*3430	[0.25]	Clinical Medicine I

**Phase 2**

VETM*3220	[0.50]	Art of Veterinary Medicine II
VETM*3410	[0.75]	Health Management II
VETM*3440	[0.50]	Clinical Medicine II
VETM*3450	[2.75]	Principles of Disease in Veterinary Medicine
VETM*3460	[0.75]	Theriogenology
VETM*3470	[0.75]	Anaesthesiology and Pharmacology
VETM*3510	[0.25]	Principles of Surgery

**Phase 3**

VETM*4220	[0.50]	Art of Veterinary Medicine III
VETM*4420	[0.25]	Clinical Pharmacology
VETM*4450	[0.50]	Equine Medicine and Surgery

VETM*4460	[1.00]	Food Animal Medicine and Surgery
VETM*4470	[1.00]	Medicine and Surgery of Dog and Cat
VETM*4480	[0.75]	Comparative Medicine
VETM*4490	[1.00]	Systems Pathology
VETM*4530	[0.50]	Health Management III
VETM*4540	[1.75]	Surgical Exercises
VETM*4870	[0.25]	Clinical Medicine III

**Phase 4**

Students entering into the Phase 4 of the DVM Program will select an area of emphasis from either: Small Animal Stream, Rural Community Practice Stream, Equine Stream or the Food Animal Stream.

**Small Animal Stream:**

VETM*4610	[7.50]	Small Animal Stream
VETM*4900	[2.50]	Veterinary Externship

**Rural Community Practice Stream:**

VETM*4660	[7.50]	Rural Community Practice Stream
VETM*4900	[2.50]	Veterinary Externship

**Equine Stream:**

VETM*4920	[7.50]	Equine Stream
VETM*4900	[2.50]	Veterinary Externship

**Food Animal Stream:**

VETM*4710	[7.50]	Food Animal Stream
VETM*4900	[2.50]	Veterinary Externship

## Co-operative Education Programs

Co-operative Education (Co-op), constitutes part of the student's formal education and is available in 35 majors for students. A form of work integrated learning, Co-op is a model of education that integrates a student's academic learning with periods of paid workplace learning in fields relevant to the student's academic and personal/professional goals. The academic and work schedules will vary with degree program and major. The first co-op work term is scheduled after the third or fourth academic semester, providing an academic foundation on which to build the work experience.

Each co-op position is developed and approved in collaboration between the employer and Co-operative Education Career Services (CECS). Students participate in a competitive employment process to secure an approved co-op position that is relevant to the student's area of academic study. COOP\*1100 – Introduction to Co-operative Education, a mandatory, non-credit course, is a prerequisite for the first co-op work term and prepares the student for the employment process.

The student's performance in the workplace is supervised and evaluated by the student's employer using the Work Performance Evaluation tool. The student's progress during the work term is also monitored by CECS, which may include a site visit during the co-op work term and a review of the student's official Learning Goals. A Co-op Work Report is required for each co-op work term and is graded by an assigned Co-op Faculty Advisor. All evaluation grades will appear on the student's official transcript.

The Co-operative Education program at the University of Guelph is accredited by the Canadian Association for Co-operative Education (CAFCE), therefore standardized guidelines regarding co-op programs will be followed at all times.

In addition to Co-operative Education CECS supports, trains and leads students and alumni as they make career and further education planning decisions. Successful students connect with CECS early in their academic career and take full advantage of the career planning and job search services offered. CECS helps students to discern "what to do with their degree". As well, the CECS job posting service, Recruit Guelph, provides online job postings including full-time, part-time, contract, seasonal, summer and internships. Job & Career Fairs and employer networking events also provide exposure to the working world. Please refer to [www.recruitguelph.ca](http://www.recruitguelph.ca) for more information.

### Admission Information

Normally students are admitted to a Co-operative Education program directly from high school in the Fall semester through Admission Services. For a complete listing of University of Guelph admission requirements refer to [www.uoguelph.ca/admissions](http://www.uoguelph.ca/admissions).

Some programs may admit a limited number of in-course students after first or second semester. Refer to the schedule of dates in the Undergraduate Calendar for in-course application deadlines.

External transfer students may apply to Co-operative Education following admission to the University of Guelph. Students must not be beyond second year of their studies and be interested in one of 35 co-operative education programs available at the University of Guelph. Interested students should visit <https://www.recruitguelph.ca/cecs/co-op/external-transfer-students> for up-to-date information on admission eligibility.

The decision to admit an in-course or external transfer student is dependent upon space in the program, the grades of the student, the approved Academic & Work Sequence Agreement, and any other information relevant to the program.

### Eligibility

High school students must have a minimum average of 80% to apply to the co-op program. Once accepted to the University of Guelph, the student must maintain a 70% cumulative average in the first 2 semesters of full-time study in order to continue in the co-op program.

First year in-course students must maintain a 70% cumulative average in their academic semester(s) prior to admission to the co-op program. There must also be space in the co-op program in which they wish to be admitted.

Transfer students must meet normal admission requirements, as well as submit an official transcript from their previous educational institution, and achieve a minimum 70% cumulative average prior to participating in the co-op employment process. An academic and work schedule must also be approved by the academic department prior to the student being accepted into the co-op program.

### Continuation of Study

Students are required to meet a continuation requirement at the end of semester two. Students will be allowed to continue in the co-op program if their cumulative average, over 4.0 credits, is 70% or higher after two full-time academic semesters. \* Students are also required to meet the conditions for continuation of study for their degree program as listed in the Undergraduate Calendar. In addition, all students must satisfactorily complete COOP\*1100 - Introduction to Co-operative Education in the semester scheduled.

Co-op students are required to be registered full-time for the duration of their program as outlined in the schedule of studies listed in the Undergraduate Calendar. Co-op students are also required to meet other conditions, (e.g. satisfactory co-op work reports, work performance evaluations and Learning Goals) in order to continue in the co-op program. Complete conditions for continuation of study for a co-op program are outlined in the "Policy Agreement for Student Involvement in Co-operative Education University of Guelph". The complete policy can be viewed at <https://www.recruitguelph.ca/cecs/sites/recruitguelph.ca/cecs/files/Co-opPolicyAgreement.pdf>

\* Students that cannot follow the prescribed schedule for their co-op program due to a disability may require an approved accommodation plan. CECS must approve the accommodation plan and students may be requested to provide additional information during the approval process.

### Release of Academic Information

By applying to the co-op program, students grant permission to the Office of Registrarial Services to release to Co-operative Education & Career Services their University of Guelph transcript and any transcript from other post-secondary institutions that may be part of the Academic Record held by the Office of Registrarial Services.

Students also grant permission to Co-operative Education & Career Services to release their resumes, cover letters and any transcripts released by the Office of Registrarial Services to prospective employers to whom the students are applying. Employment information, the Co-op Work Performance Evaluation grade, and the Co-op Work Report Evaluation grade will appear on the student's official academic transcript for each co-op work term accepted by the student.

### Procedures for Work Semester Reports

A Co-op Work Report is required for each co-op work term which the student accepts. Co-op Work Reports must be submitted to the Co-op Faculty Advisor according to the deadline indicated in the Undergraduate Calendar. The Co-op Faculty Advisor is responsible for grading the co-op work report within the agreed to deadlines listed in the Schedule of Dates. Students completing two consecutive co-op work terms with the same employer should consult with their Co-op Faculty Advisor regarding co-op work report requirements for eight-month co-op work terms. A grade of Outstanding, Very Good, Good, Satisfactory, or Unsatisfactory will appear on the student's Academic Record.

A student who does not submit a Co-op Work Report will be required to withdraw from co-op and a grade of "Required to Withdraw from Co-op" will be assigned to the student's official transcript. A student who receives an Unsatisfactory Co-op Work Report Evaluation will be given one opportunity to make revisions and resubmit the co-op report during the semester following the co-op work term. Students who are resubmitting a co-op work report within the prescribed timeline will not be eligible to proceed to the next employment process until receiving a grade of Satisfactory or higher on the report. If, upon resubmission, the co-op work report evaluation remains Unsatisfactory, the student will be required to withdraw from Co-op and will be transferred to the regular program.

Confidential Co-op Work Reports are not permitted.

### Conditions for Graduation

In order to graduate with co-op certification, co-op students must follow the conditions for graduation for their degree program as outlined in the Undergraduate Calendar. In addition, co-op students must receive evaluations of Good or higher in all but one Work Performance Evaluations and an evaluation of Satisfactory or higher in all Co-op Work Report Evaluations. Students must also have paid all required co-op fees, including eight academic semesters and all co-op work terms, prior to receiving co-op certification.

As the University of Guelph co-op program is accredited by the The Canadian Association for Co-operative Education (CAFCE), standardized guidelines regarding co-op work terms will be followed at all times.

### Co-op Fees

As determined by the University of Guelph's Board of Governors, involvement in the Co-op Program requires Co-op students to pay a co-op fee for a maximum of 8 academic semesters and all accepted co-op work terms (see Section VI--Schedule of Fees). It is important to note that co-op fees are amortized over the entire program and not related to the specific services received in any one term.

Co-op fees will be paid each academic and co-op work term semester and will be billed to the student's financial account. If registered for an academic course during a co-op work term both the academic and co-op work term semester fees will be billed. If registered in an academic course during an OFF semester the co-op academic fee will be charged. In both cases the co-op academic fee will count towards the maximum of 8 academic fees.

If a student does not follow the prescribed schedule in the Undergraduate Calendar, this may result in an under or over payment on the student's account. To resolve these issues, the student is required to contact CECS. Students are responsible for paying all other university fees as outlined in the Undergraduate Calendar.

Withdrawing from Co-op after accepting a second co-op work term will result in the student being responsible for paying the balance of their remaining co-op academic fees at the time of withdrawal.

Withdrawing from Co-op after accepting an eight or twelve month co-op work term will result in the student being responsible for paying the balance of their remaining co-op academic fees at the time of withdrawal.

### **Schedule of Studies**

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Students are required to follow the schedule of studies as outlined in the Undergraduate Calendar. Where a program has two co-op stream options, students will be defaulted to an established "Stream A".

If, under exceptional circumstances, the schedule cannot be followed, the student must obtain written approval of an alternative Co-op Academic/ & Work Sequence Agreement from the academic department and submit the form to CECS for final approval.



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## **University of Guelph-Humber**

For University of Guelph-Humber programs please refer to <http://www.guelphhumber.ca>.

## **Associate Diploma Programs**

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For Associate Diploma Programs please refer to the Associate Diploma Program Calendar, available on the world wide web at [http://www.uoguelph.ca/diploma\\_calendar/](http://www.uoguelph.ca/diploma_calendar/).