

# 2014-2015 Undergraduate Calendar

The information published in this Undergraduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2014-2015 academic year, including the Summer Semester 2014, the Fall Semester 2014 and the Winter Semester 2015.

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.

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IMPROVING LIFE

# Disclaimer

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## University of Guelph 2014

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The information published in this Undergraduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2014-2015 academic year, including the Summer Semester 2014, the Fall Semester 2014 and the Winter Semester 2015.

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.

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## **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 Training, Colleges and Universities, 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>.

### **Statistics Canada - Notification of Disclosure**

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For further information, please see 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**

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

#### **Home Address**

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Students are responsible for maintaining a current mailing address with the University. Address changes can be made, in writing, through 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 <http://www.uoguelph.ca/policies/pdf/ORSInfoReleasePolicy060610.pdf>.



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## 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

0.75 credits in the Area of Application or elective

0.50 C.I.S electives at the 3000 level or above

#### 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  
 0.75 credits in the Area of Application or elective  
 0.50 C.I.S. electives at the 3000 level or above

#### 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