COMPUTER ENGINEERING (CENG)

School of Engineering, College of Engineering and Physical Sciences

Computer Engineering – the application of computer science and electrical/electronics engineering to develop computer hardware and software. Graduates in Computer Engineering gain skills and use computer aided-design tools that enable them to design, implement, and develop processors, hardware accelerators and associated software. These skills lead to efficient hardware/software co-design and the ability to develop user/application-level software. This major 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 broad technical background. Electives are available in the areas of Embedded Systems, Artificial Intelligence, Software Design, Computer Communications, Circuit Design and VLSI, Controls and Robotics.

Major Requirements (Honours)

This is a major within the degree: Bachelor of Engineering.

Code	Title	Credits
Semester 1		
CHEM*1040	General Chemistry I	0.50
ENGG*1100	Engineering and Design I	0.75
ENGG*1410	Introductory Programming for Engineers	0.50
MATH*1200	Calculus I	0.50
PHYS*1130	Physics with Applications	0.50
Semester 2		
ENGG*1210	Engineering Mechanics I	0.50
ENGG*1420	Object-Oriented Programming for Engineers	0.50
ENGG*1500	Engineering Analysis	0.50
MATH*1210	Calculus II	0.50
PHYS*1010	Introductory Electricity and Magnetism	0.50
Semester 3		
CIS*2520	Data Structures	0.50
ENGG*2400	Engineering Systems Analysis	0.50
ENGG*2410	Digital Systems Design Using Descriptive Languages	0.50
MATH*2270	Applied Differential Equations	0.50
STAT*2120	Probability and Statistics for Engineers	0.50
0.50 restricted electives		0.50
Semester 4		
CIS*2910	Discrete Structures in Computing II	0.50
ENGG*2100	Engineering and Design II	0.75
ENGG*2450	Electric Circuits	0.50
ENGG*3380	Computer Organization and Design	0.50
MATH*2130	Numerical Methods	0.50
0.50 restricted electives [1]		0.50
Semester 5		
ENGG*3390	Signal Processing	0.50
ENGG*3450	Electronic Devices	0.50
ENGG*3640	Microcomputer Interfacing	0.50
ENGG*4450	Large-Scale Software Architecture Engineering	0.50
HIST*1250	Science and Technology in a Global Context	0.50
0.50 restricted electives		0.50
Semester 6		
CIS*3110	Operating Systems I	0.50
CIS*3490	The Analysis and Design of Computer Algorithms	0.50
ENGG*3100	Engineering and Design III	0.75
ENGG*3210	Communication Systems	0.50
ENGG*3410	Systems and Control Theory	0.50
0.50 restricted electives		0.50
Semester 7		
ENGG*3050	Embedded Reconfigurable Computing Systems	0.50
ENGG*3240	Engineering Economics	0.50
ENGG*4000	Proposal for Engineering Design IV	0.00
ENGG*4420	Real-time Systems Design	0.75
1.00 restricted electives		1.00
Semester 8		
ENGG*4170	Computer Engineering Design IV	1.00
ENGG*4540	Advanced Computer Architecture	0.50
ENGG*4550	VLSI Digital Design	0.50
1.00 restricted electives		1.00

[1] CIS*2750 Software Systems Development and Integration recommended for students interested in the software area of interest.

Restricted Electives

(see Program Guide for more information)

The Engineering Program requires Computer Engineering students to complete the following combination of elective credits to complete their program:

- 2.00 credits from the CENG-1 Computer Engineering electives
- 2.00 credits from Complementary Studies electives

Consult the Program Guide for further information on the prerequisite requirements specific to each elective.

Co-op Requirements (Honours)

This is a major within the degree: Bachelor of Engineering.

The Co-op program in Computer Engineering is a five year program, including five work terms. Students must follow the academic work schedule as outlined below (also found on the Co-operative Education website: https://www.recruitguelph.ca/cecs/).

Academic and Co-op Work Term Schedule

Year	Fall	Winter	Summer
1	Academic Semester 1	Academic Semester 2	Off
2	Academic Semester 3 COOP*1100	Academic Semester 4	COOP*1000 Work Term I

3	Academic Semester 5	COOP*2000 Work Term II	COOP*3000 Work Term III
4	Academic Semester 6	Academic Semester 7	COOP*4000 Work Term IV
5	COOP*5000 Work Term V	Academic Semester 8	N/A

Please refer to the Co-operative Education program policy with respect to work term performance grading, work term report grading and program completion requirements.

For additional program information students should consult with their Co-op Co-ordinator and Co-op Faculty Advisor, listed on the Co-operative Education web site.

Credit Summary

(26.00 Total Credits)

Code	Title	Credits
Required Core Courses		19.50
CENG-1 Computer Engineering Electives		2.00
Complementary Studies Electives		2.00
Co-op Work Terms		2.50
Total Credits		**26**

Recommended Program Sequence

Code	Title	Credits
Semester 1 - Fall		
CHEM*1040	General Chemistry I	0.50
ENGG*1100	Engineering and Design I	0.75
ENGG*1410	Introductory Programming for Engineers	0.50
MATH*1200	Calculus I	0.50
PHYS*1130	Physics with Applications	0.50
Semester 2 - Winter		
ENGG*1210	Engineering Mechanics I	0.50
ENGG*1420	Object-Oriented Programming for Engineers	0.50
ENGG*1500	Engineering Analysis	0.50
MATH*1210	Calculus II	0.50
PHYS*1010	Introductory Electricity and Magnetism	0.50
Summer Semester		
No academic semester or work term		
Semester 3 - Fall		
CIS*2520	Data Structures	0.50
COOP*1100	Introduction to Co-operative Education	0.00
ENGG*2400	Engineering Systems Analysis	0.50
ENGG*2410	Digital Systems Design Using Descriptive Languages	0.50
MATH*2270	Applied Differential Equations	0.50
STAT*2120	Probability and Statistics for Engineers	0.50
0.50 restricted electives		0.50
Semester 4 - Winter		
CIS*2910	Discrete Structures in Computing II	0.50
ENGG*2100	Engineering and Design II	0.75
ENGG*2450	Electric Circuits	0.50
ENGG*3380	Computer Organization and Design	0.50
MATH*2130	Numerical Methods	0.50
0.50 restricted electives [1]		0.50
Summer Semester		
COOP*1000	Co-op Work Term I	0.50
Semester 5 - Fall		
ENGG*3390	Signal Processing	0.50
ENGG*3450	Electronic Devices	0.50
ENGG*3640	Microcomputer Interfacing	0.50
ENGG*4450	Large-Scale Software Architecture Engineering	0.50
HIST*1250	Science and Technology in a Global Context	0.50
0.50 restricted electives		0.50
Winter Semester		
COOP*2000	Co-op Work Term II	0.50
Summer Semester		
COOP*3000	Co-op Work Term III	0.50
Semester 6 - Fall		
ENGG*3050	Embedded Reconfigurable Computing Systems	0.50
ENGG*3240	Engineering Economics	0.50
ENGG*4420	Real-time Systems Design	0.75
1.00 restricted electives		1.00
Semester 7 - Winter		
CIS*3110	Operating Systems I	0.50
CIS*3490	The Analysis and Design of Computer Algorithms	0.50
ENGG*3100	Engineering and Design III	0.75
ENGG*3210	Communication Systems	0.50
ENGG*3410	Systems and Control Theory	0.50
0.50 restricted electives		0.50
Summer Semester		
COOP*4000	Co-op Work Term IV	0.50
Fall Semester		
COOP*5000	Co-op Work Term V	0.50
ENGG*4000	Proposal for Engineering Design IV	0.00
Semester 8 - Winter		
ENGG*4170	Computer Engineering Design IV	1.00
ENGG*4540	Advanced Computer Architecture	0.50
ENGG*4550	VLSI Digital Design	0.50
1.00 restricted electives		1.00

[1] CIS*2750 Software Systems Development and Integration recommended for students interested in the software area of interest.

Restricted Electives

(see Program Guide for more information)

The Engineering Program requires Computer Engineering students to complete the following combination of elective credits to complete their program:

- 2.00 credits from the CENG-1 Computer Engineering electives
- 2.00 credits from Complementary Studies electives

Consult the Program Guide for further information on the prerequisite requirements specific to each elective.