

# COMPUTER ENGINEERING, B.SC.

## Degree Requirements

### Computer Engineering Departmental Program

Course	Title	Hours
Students must complete the Preliminary Engineering Program requirements for graduation.		37.5
ANTH 2430	Ecology, Technology and Society <sup>1</sup>	3
COMP 1020	Introductory Computer Science 2	3
COMP 2140	Data Structures and Algorithms	3
Choose one of: <sup>2</sup>		3-4
COMP 3010	Distributed Computing	
COMP 3430	Operating Systems	
ECE 3630	Real-time Embedded Systems	
ECE 4530	Parallel Processing	
ENG 2030	Engineering Communication: Strategies for the Profession	3
or ENG 2040	Engineering Communication: Strategies, Practice and Design	
ENG 3000	Engineering Economics	3
MATH 2130	Engineering Mathematical Analysis 1	3
MATH 2132	Engineering Mathematical Analysis 2	3
MATH 2136		3
PHYS 2152	Modern Physics for Engineers	3
STAT 2220	Contemporary Statistics for Engineers	3
ECE 2160	Electronics 2E	5
ECE 2220	Digital Logic Systems	5
ECE 2262	Electric Circuits	4
ECE 2400		4
ECE 3400		4
ECE 3610	Microprocessing Systems	4
ECE 3700	Telecommunication Network Engineering	4
ECE 3740	Systems Engineering Principles 1	4
ECE 3760	Digital Systems Design 1	4
ECE 3780	Signal Processing 1	4
ECE 4150	Control Systems	4
or ECE 4260	Communications Systems	
ECE 4240	Microprocessor Interfacing	4
ECE 4830	Signal Processing 2	4
ECE 4600	Group Design Project <sup>3</sup>	6
One Complementary Studies Elective <sup>4</sup>		3
Two Natural Science Electives from the approved list		6
Five Technical Electives from the approved list		15-20
<b>Total Hours</b>		<b>154.5-160.5</b>

<sup>1</sup> ANTH 2430 is an Indigenous Knowledge course.

<sup>2</sup> The course selected to meet this requirement may not also be counted as a Technical Elective.

<sup>3</sup> Course continues through both terms with credit given upon completion.

<sup>4</sup> The complementary studies elective can be any course at the 1000 level or above from either the faculties of Arts or Management. However, ARTS 1110 may not be used for credit in the Price Faculty of Engineering.

### Computer Engineering Technical Electives <sup>1</sup>

Students may select their five technical electives from the following approved list of courses from Computer Engineering, Electrical Engineering, or Computer Science, with the only limitations that no more than two may come from the list of Approved Electrical Engineering Electives.

### Computer Engineering Electives

Course	Title	Hours
ECE 3750	Systems Engineering Principles 2	4
ECE 3770	Digital Systems Design 2	4
ECE 4180	Introduction to Robotics	4
ECE 4250	Digital Communications	4
ECE 4420	Digital Control	4
ECE 4440	Computer Vision	4
ECE 4450	Applied Computational Intelligence	4
ECE 4520	Simulation and Modelling	4
ECE 4530	Parallel Processing	4
ECE 4560	Modern Computing Systems	4
ECE 4540	Wireless Networks	4
ECE 4740	Digital Systems Implementation	4
ECE 4850	Topics in Electrical and Computer Engineering 1 <sup>2</sup>	4
ECE 4860	Topics in Electrical and Computer Engineering 2 <sup>2</sup>	4
ECE 4870	Topics in Electrical and Computer Engineering 3 <sup>2</sup>	3
ECE 4880	Topics in Electrical and Computer Engineering 4 <sup>2</sup>	3

<sup>1</sup> The Department of Electrical and Computer Engineering does not guarantee that all elective courses will be offered every session or that it will be possible to fit courses into all of the many possible timetable combinations of students taking the programs. The term in which an elective course is offered is specified each year in Aurora and on the Department website. There may be a maximum limit on the number of students allowed to take an elective in a particular session. Similarly, there may be a minimum limit and if registration is below the minimum, the elective will be cancelled for the session, and those registered will be required to transfer to another elective before registration revision deadline.

<sup>2</sup> Requires permission of the Department.

### Approved Electrical Engineering Electives (maximum of 2) <sup>1</sup>

Course	Title	Hours
ECE 3540	Advanced Circuit Analysis and Design	4
ECE 3580	Foundations of Electromagnetics	4
ECE 3600	Physical Electronics	4
ECE 3670	Electronics 3E	4
ECE 3720	Electric Power and Machines	4
ECE 4100	Introduction to Microelectronic Fabrication	4
ECE 4150	Control Systems	4
ECE 4160	Control Engineering	4
ECE 4260	Communications Systems	4

ECE 4390	Engineering Computations 4E	4
ECE 4610	Biomedical Instrumentation and Signal Processing	4

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PHYS 2386	Introduction to Quantum Mechanics and Special Relativity	3
PHYS 2600	Electromagnetic Field Theory	3
PHYS 2650	Classical Mechanics 1	3
PHYS 3220	Medical Physics and Physiological Measurement	3
PHYS 3630	Electro - and Magnetostatic Theory	3

**Note:**

- Students are urged to discuss their program of courses with members of the instructional staff before the end of their third year to obtain advice concerning the best choice of electives for their needs.

**Approved Computer Science Electives**

Course	Title	Hours
COMP 2150	Object Orientation	3
COMP 2160	Programming Practices	3
COMP 3010	Distributed Computing	3
COMP 3020	Human-Computer Interaction 1	3
COMP 3190	Introduction to Artificial Intelligence	3
COMP 3290	Introduction to Compiler Construction	3
COMP 3350	Software Engineering 1	3
COMP 3430	Operating Systems	3
COMP 3380	Databases Concepts and Usage	3
COMP 3490	Computer Graphics 1	3
COMP 4020	Human-Computer Interaction 2	3
COMP 4190	Artificial Intelligence	3
COMP 4350	Software Engineering 2	3
COMP 4360	Machine Learning	3
COMP 4380	Database Implementation	3
COMP 4430	Operating Systems 2	3
COMP 4490	Computer Graphics 2	3
COMP 4580	Computer Security	3
COMP 4710	Introduction to Data Mining	3

**Natural Science Electives for Computer Engineering**

The Computer Engineering program requires students to complete two (2) Natural Science Electives as part of their program selected from a Department approved list. These courses may be taken anytime during the student's program.

Course	Title	Hours
ASTR 1810	Introduction to Astronomy: The Magnificent Universe	3
ASTR 3180	Stars	3
BIOL 1020	Biology 1: Principles and Themes	3
BIOL 1300	Economic Plants	3
BIOL 1410	Anatomy of the Human Body	3
CHEM 1110	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties	3
CHEM 1130	Introduction to Organic Chemistry	3
ENTM 2050	Introductory Entomology	3
GEOL 1340	The Dynamic Earth	3
MBIO 1220	Essentials of Microbiology	3
PHYS 2260	Optics	3