

(For students admitted in 2025-26 under the 4-year degree)

## BEng in Computer Engineering

In addition to the requirements of their major programs, students are required to complete the University requirements for graduation. For details please refer to the respective section on this website.

Students may use no more than 9 credits earned from courses offered in self-paced online delivery mode to satisfy the graduation requirements of a degree program. This 9-credit limit does not apply to credits obtained through the credit transfer procedures of the University.

For students graduating with an additional major, they must take all the requirements specified for that major, within which they must complete at least 20 single-counted credits. These 20 credits cannot be used to fulfill any other requirements for graduation except for the 120-credit degree requirement.

Under the new 30-credit Common Core Program which is applicable to students admitted to the University in 2022-23 and thereafter, courses that have been counted towards Major Requirements are not allowed to be reused for fulfilment of the University Common Core Requirements. Students should look up the details of the Common Core Program including the general and School-/program-specific distributional requirements posted on the Common Core website where the link to it is available on this website.

### Major Requirements

#### Engineering Fundamental Course(s)

			Credit(s) attained
COMP	1023	Introduction to Python Programming	3
MATH		Note: [(MATH 1013 <u>OR</u> MATH 1023) <u>AND</u> (MATH 1014 <u>OR</u> MATH 1024)] <u>OR</u> [MATH 1020]	4-6
	MATH 1013	Calculus I	3
	MATH 1014	Calculus II	3
	MATH 1020	Accelerated Calculus	4
	MATH 1023	Honors Calculus I	3
	MATH 1024	Honors Calculus II	3
MATH	2011	Introduction to Multivariable Calculus	3
MATH	2111	Matrix Algebra and Applications	3
PHYS		Note: PHYS 1112 <u>OR</u> PHYS 1312	3
	PHYS 1112	General Physics I with Calculus	3
	PHYS 1312	Honors General Physics I	3
PHYS		Note: PHYS 1114 <u>OR</u> PHYS 1314	3
	PHYS 1114	General Physics II	3
	PHYS 1314	Honors General Physics II	3

## Required Course(s)

			Credit(s) attained
CPEG	1930	Academic and Professional Development I	0
CPEG		Note: [CPEG 1971 <u>AND</u> (CPEG 4901 <u>OR</u> CPEG 4902 <u>OR</u> CPEG 4911 <u>OR</u> CPEG 4912)] <u>OR</u> [CPEG 4910] (Students taking the Research Option must take either CPEG 4902 or CPEG 4912)	6
CPEG	1971	Industrial Experience	0
CPEG	4901	Computer Engineering Final Year Project in COMP	6
CPEG	4902	Computer Engineering Final Year Thesis in COMP	6
CPEG	4910	Co-op Program	6
CPEG	4911	Computer Engineering Final Year Project in ELEC	6
CPEG	4912	Computer Engineering Final Year Thesis in ELEC	6
CPEG	2930	Academic and Professional Development II	0
CPEG	3930	Academic and Professional Development III	0
COMP		Note: (COMP 2011 <u>AND</u> COMP 2012) <u>OR</u> COMP 2012H	5-8
COMP	2011	Programming with C++	4
COMP	2012	Object-Oriented Programming and Data Structures	4
COMP	2012H	Honors Object-Oriented Programming and Data Structures	5
COMP/ELEC		Note: COMP 2611 <u>OR</u> ELEC 2350	4
COMP	2611	Computer Organization	4
ELEC	2350	Introduction to Computer Organization and Design	4
COMP		Note: COMP 2711 <u>OR</u> COMP 2711H	4
COMP	2711	Discrete Mathematical Tools for Computer Science	4
COMP	2711H	Honors Discrete Mathematical Tools for Computer Science	4
COMP	3511	Operating Systems	3
ELEC	1100	Introduction to Electro-Robot Design	4
ELEC	2100	Signals and Systems	4
ELEC	2400	Electronic Circuits	4
ELEC	2600	Probability and Random Processes in Engineering	4
ELEC	3300	Introduction to Embedded Systems	4

## Elective(s)

			<b>Minimum credit(s) required</b>
COMP/ELEC/ ENGG		Area Courses [At least 2 courses should be taken from one area and at least 1 course outside that area (including course(s) in the Courses without Associated Area).]	12
<b>Artificial Intelligence / Theory Area</b>			
COMP	3211	Learning, Reasoning, and Decision Making in AI	3
COMP	3711	Design and Analysis of Algorithms	3
COMP	3711H	Honors Design and Analysis of Algorithms	4
COMP	3721	Theory of Computation	3
COMP	4211	Machine Learning	3
COMP	4221	Introduction to Natural Language Processing	3
COMP	4222	Machine Learning with Structured Data	3
COMP	4331	Data Mining	3
COMP	4332	Big Data Mining and Management	3
COMP	4421	Image Processing	3
COMP	4471	Deep Learning in Computer Vision	3
COMP	4541	Blockchain, Cryptocurrencies and Smart Contracts	3
COMP	5211	Advanced Artificial Intelligence	3
COMP	5212	Machine Learning	3
COMP	5214	Advanced Deep Learning Architectures	3
COMP	5215	Perception and Information Processing for Robotics	3
COMP	5221	Natural Language Processing	3
COMP	5331	Knowledge Discovery in Databases	3
COMP	5421	Computer Vision	3
COMP	5711	Introduction to Advanced Algorithmic Techniques	3
COMP	5712	Introduction to Combinatorial Optimization	3
COMP	5713	Computational Geometry	3
ELEC	3180	Data-Driven Portfolio Optimization	3
ELEC	3210**	Signals and Systems II	4
ELEC	3350	Principles of Machine Learning	3
ELEC	4240	Deep Learning in Computer Vision	3
ELEC	4840	Artificial Intelligence for Medical Image Analysis	3
<b>Communications Area</b>			
ELEC	3100	Signal Processing and Communications	4
ELEC	3600	Electromagnetics: From Wireless to Photonic Applications	4
ELEC	4110	Digital Communications and Wireless Systems	3
ELEC	4610	Engineering Optics	4
ELEC	4620	Photonics and Optical Communications	4

**Embedded System / Robotics Area**

COMP	4511**	System and Kernel Programming in Linux	3
COMP	4521	Mobile Application Development	3
COMP	4531	IoT and Smart Sensing	3
COMP	4611	Design and Analysis of Computer Architectures	3
ELEC	3200	System Modeling, Analysis and Control	4
ELEC	3210**	Signals and Systems II	4
ELEC	3310	Digital Fundamentals and System Design	4
ELEC	4210	Control System Design	3
ELEC	4220	Robotics: Modeling, Control and Planning	3
ELEC	4260	Intelligent Robots and Embodied AI	3
ELEC	4310**	Embedded System Design	4
ELEC	4320	FPGA-based Design: From Theory to Practice	3
ENGG	3960-3962	Robotics Special Project	1-4
ENGG	4950	Engineering Special Project	1-4

**Graphic / Multimedia Area**

COMP	4411	Computer Graphics	3
COMP	4421	Image Processing	3
COMP	4431	Multimedia Computing	3
COMP	4441	Music Video Creation	3
COMP	4451	Game Programming	3
COMP	4461	Human-Computer Interaction	3
COMP	4462	Data Visualization	3
COMP	4471	Deep Learning in Computer Vision	3
COMP	5411	Advanced Computer Graphics	3
COMP	5421	Computer Vision	3

**Semiconductor / VLSI Area**

ELEC	3400	Introduction to Integrated Circuits and Systems	4
ELEC	3410	CMOS VLSI Design	3
ELEC	3500	Integrated Circuit Devices	4
ELEC	4420	Analogue Integrated Circuits Design and Analysis	4
ELEC	4430	Integrated Power Electronics	3
ELEC	4510	Semiconductor Physics for Solid-State Electronics	3
ELEC	4520	Integrated Circuit Fabrication Technology	3
ELEC	4530	Fundamentals of Photovoltaic and Renewable Energy	3

**Signal Processing Area**

ELEC	3100	Signal Processing and Communications	4
ELEC	3130	Digital Image Processing	3
ELEC	4810	Introduction to Biosensors and Bioinstrumentation	4
ELEC	4820	Medical Imaging	3
ELEC	4830	Statistical Signal Analysis and Applications in Neural Engineering	3

Software / Database Area

COMP	3021	Java Programming	3
COMP	3031	Principles of Programming Languages	3
COMP	3111	Software Engineering	4
COMP	3111H	Honors Software Engineering	4
COMP	3311	Database Management Systems	3
COMP	4021	Internet Computing	3
COMP	4121	Modern Compiler Construction	3
COMP	4321	Search Engines for Web and Enterprise Data	3
COMP	4331	Data Mining	3
COMP	4332	Big Data Mining and Management	3
COMP	4521	Mobile Application Development	3
COMP	4651	Cloud Computing and Big Data Systems	3
COMP	5111	Fundamentals of Software Analysis	3
COMP	5112	Parallel Programming	3
COMP	5311	Database Architecture and Implementation	3
COMP	5331	Knowledge Discovery in Databases	3
ELEC	3810	Data Science for Neural Engineering	3

Systems / Networking Area

COMP	3631	Cryptography	3
COMP	4511**	System and Kernel Programming in Linux	3
COMP	4521	Mobile Application Development	3
COMP	4531	IoT and Smart Sensing	3
COMP	4541	Blockchain, Cryptocurrencies and Smart Contracts	3
COMP	4611	Design and Analysis of Computer Architectures	3
COMP	4621	Computer and Communication Networks	3
COMP	4632	Practicing Cybersecurity: Attacks and Counter-measures	3
COMP	4634	Cybersecurity	3
COMP	4635	Practical Cloud Computing Security	3
COMP	4641	Social Information Network Analysis and Engineering	3
COMP	4651	Cloud Computing and Big Data Systems	3
COMP	5621	Computer Networks	3
COMP	5631	Cryptography and Security	3
ELEC	3120	Computer Communication Networks	3
ELEC	4310**	Embedded System Design	4
ELEC	4350	AI Processor Architecture	3

Courses Without Associated Area

COMP	4911	IT Entrepreneurship	3
COMP/ELEC		COMP/ELEC 2000-level or above Elective (Any course(s) of the subject and level as specified)	3

Students may opt to graduate with or without an option. Students who take an option **MUST** complete all requirements specified in addition to the major requirements.

## Option(s)

### Research Option

Students in the Research Option should also take either CPEG 4902 or CPEG 4912 as specified in the major requirements.

<i>Elective Course(s)</i>	<b>Minimum credit(s) required</b>
COMP/ELEC/ UROP	3-4
Research Electives [Students should take either (ELEC 5900 <u>AND</u> UROP 1100) or a 3-credit COMP 5000-level course to fulfill this requirement.]	
COMP	Any COMP course at 5000-level
ELEC     5900	Modern Engineering Research Methodologies     3
UROP     1100	Undergraduate Research Opportunities Series 1     1
COMP/ELEC	CPEG Electives (1 PG-level course as approved by advisor)     3

**\*\*Remarks on course(s):**

- COMP 4511:     The course was last offered in 2020-21 and was deleted subsequently.
- ELEC 3210:     The course was last offered in 2024-25 and was deleted subsequently.
- ELEC 4310:     The course was last offered in 2020-21 and was deleted subsequently.