Computer Engineering, BSCmpE

The use of computer technology is exploding, driven by applications in wireless communications, multimedia, portable devices, and internet computing. At the core of these technological advances are computer engineers who research, design, and develop hardware and software. With a degree in computer engineering you might develop a full-featured multimedia phone, design the next-generation microprocessor, program computer-guided cameras to inspect nanomanufacturing facilities, or start your own software company.

The computer engineering major acquires a strong foundation in engineering principles and the physical sciences in addition to a powerful mix of theory and practice in hardware and software design. The core of the computer engineering curriculum comprises courses in computer organization and architecture, computer networks, computer-aided design, programming languages, optimization theory, and software design.

The BSCmpE degree requires a sequence of core courses, technical electives, general electives, and electives in the arts and humanities and social sciences.

Visit the department website (https://ece.northeastern.edu/academics/undergraduate-studies/ece-accreditation/) for program educational objectives.

Program Requirements

- Concentrations and course offerings may vary by campus and/or by program modality. Please consult with your advisor or admissions coach for the course availability each term at your campus or within your program modality.
- Certain options within the program may be *required* at certain campuses or for certain program modalities. Please consult with your advisor or admissions coach for requirements at your campus or for your program modality.

Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified and complete any additional courses needed beyond specific college and major requirements to satisfy graduation credit requirements.

Universitywide Requirements

All undergraduate students are required to complete the Universitywide Requirements (https://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/).

NUpath Requirements

All undergraduate students are required to complete the NUpath Requirements (https://catalog.northeastern.edu/undergraduate/university-academics/nupath/).

NUpath requirements: Interpreting Culture (IC), Understanding Societies and Institutions (SI), Engaging Differences and Diversity (DD), and Integrating Knowledge and Skills Through Experience (EX) are not explicitly satisfied by required engineering coursework. Successful completion of a cooperative education experience fulfills the EX requirement. Students are responsible for satisfying unfulfilled NUpath requirements with general elective coursework.

Engineering Requirements

Code	Title	Hours
Required Courses		
EECE 2140	Computing Fundamentals for Engineers	4
EECE 2150	Circuits and Signals: Biomedical Applications	5
EECE 2160	Embedded Design: Enabling Robotics	4
Computer Engineering Fundamentals		
EECE 2322 and EECE 2323	Fundamentals of Digital Design and Computer Organization and Lab for EECE 2322	5
EECE 2540	Fundamentals of Networks	4
EECE 2560	Fundamentals of Engineering Algorithms	4
Electrical Engineering Fundamentals		
If more than one electrical engineering fundamentals course is taken, it can count as a technical elective.		
Complete one of the following:		4-5
EECE 2412 and EECE 2413	Fundamentals of Electronics and Lab for EECE 2412	
EECE 2520	Fundamentals of Linear Systems	

EECE 2530 and EECE 2531	Fundamentals of Electromagnetics and Lab for EECE 2530	
Computer Engineering Capstone Courses		
If taking EECE 4791 in Summer 1, EECE 4792 should be taken in Spring. If taking EECE 4791 in Summer 2 EECE 4792 in Fall.		
EECE 4791	Electrical and Computer Engineering Capstone 1	1
EECE 4792	Electrical and Computer Engineering Capstone 2	4
EECE Technical Electives		
Students can register for EECE 4991/EECE 4992 more than once. For these courses combined, a maximum of 8 semester hours will be allowed to satisfy the requirement of technical electives. An additional 4 semester hours will be allowed as a general elective. At most, one of these courses (4 semester hours) can be taken in a semester.		
Though students may register for EECE 2750 more than once, only 4 semester hours will be allowed to satisfy the requirements of technical electives. An additional 4 semester hours will be allowed as a general elective.		
EECE 2310 is not an approved course option for ECE majors to select for a Technical Elective, it is only for Khoury students.		
Complete four of the following:		16
EECE 2412 to EECE 2530		
EECE 2750	Enabling Engineering	
EECE 3324 to EECE 4698		
EECE 4991	Research	
EECE 4992	Directed Study	
EECE 5115 to EECE 5699		
Two CS/CY/IS courses from the following approved list may be taken toward the EECE technical elective requirement:		
CS 3200	Introduction to Databases	
CS 3500	Object-Oriented Design	
CS 3540 to CS 3800		
CS 4100 to CS 4770		
CS 4850	Building Game Engines	
CS 5100	Foundations of Artificial Intelligence	
CS 5200	Database Management Systems	
CS 5310	Computer Graphics	
CS 5400	Principles of Programming Language	
CS 5500	Foundations of Software Engineering	
CS 5520	Mobile Application Development	
CS 5600	Computer Systems	
CS 5610	Web Development	
CS 5700	Fundamentals of Computer Networking	
CY 2550	Foundations of Cybersecurity	
IS 4200 to IS 4700		
Supplemental Credit		
2 semester hours from the following course count toward the engineering requirement:		2
GE 1501	Cornerstone of Engineering 1 [1]	
3 semester hours from the following course count toward the engineering requirement:		3
GE 1502	Cornerstone of Engineering 2 [1]	
2 semester hours from the following course count toward the engineering requirement:		2
EECE 3468	Analysis of Random Phenomena in Electrical and Computer Engineering	

Supporting Courses: Mathematics/Science Requirement

Complete all mathematics/science courses with a minimum of 30 semester hours.

Code	Title	Hours
Required Mathematics/Science		
CHEM 1151 and CHEM 1153	General Chemistry for Engineers and Recitation for CHEM 1151	4
CS 1800 and CS 1802	Discrete Structures and Seminar for CS 1800	5
MATH 1341	Calculus 1 for Science and Engineering	4

MATH 1342	Calculus 2 for Science and Engineering	4
MATH 2341	Differential Equations and Linear Algebra for Engineering	4
PHYS 1151 and PHYS 1152 and PHYS 1153	Physics for Engineering 1 and Lab for PHYS 1151 and Interactive Learning Seminar for PHYS 1151	5
PHYS 1155 and PHYS 1156 and PHYS 1157	Physics for Engineering 2 and Lab for PHYS 1155 and Interactive Learning Seminar for PHYS 1155	5
Supplemental Credit		
1 semester hour from the following course counts toward the mathematics/science requirement:		1
GE 1501	Cornerstone of Engineering 1 [1]	
2 semester hours from the following course count toward the mathematics/science requirement		2
EECE 3468	Analysis of Random Phenomena in Electrical and Computer Engineering	

Professional Development

Code	Title	Hours
Required Professional Development		
ENCP 2000	Introduction to Engineering Co-op Education	1
ENCP 3000	Professional Issues in Engineering	1
GE 1000	First-Year Seminar	1
Additional Required Courses		
1 semester hour from the following course counts toward the professional development requirement:		1
GE 1501	Cornerstone of Engineering 1 [1]	
1 semester hour from the following course counts toward the professional development requirement:		1
GE 1502	Cornerstone of Engineering 2 [1]	

Writing Requirements

Code	Title	Hours
A grade of C or higher is required:		
ENGW 1111	First-Year Writing	4
ENGW 3302	Advanced Writing in the Technical Professions	4
or ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines	

Required General Electives

Code	Title	Hours
Complete 28 semester hours of academic, nonremedial, nonrepetitive courses.		28

Major GPA Requirement

2.000 minimum GPA required in EECE courses

Program Requirement

133 total semester hours required

[1] Students can substitute Engineering Design (GE 1110) and Engineering Problem Solving and Computation (GE 1111) for Cornerstone of Engineering 1 (GE 1501) and Cornerstone of Engineering 2 (GE 1502) .

Plan of Study

Sample Plans of Study

FOUR YEARS, TWO CO-OPS IN SUMMER 2/FALL

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 (ND)	4	GE 1502 (ER)	4	General elective	4	General elective	4
CHEM 1153	0	MATH 1342 (FQ)	4	General elective	4		
ENGW 1111 (WF)	4	PHYS 1151 (ND)	3				
GE 1000	1	PHYS 1152 (AD)	1				
GE 1501	4	PHYS 1153	1				

MATH 1341 (FQ)	4	General elective	4				
	17		**17**		**8**		**4**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
EECE 2140[1]	4	CS 1800 (FQ)	4	EECE 3468	4	Co-op	0
EECE 2160	4	CS 1802	1	General elective	4		
MATH 2341	4	EECE 2150 (AD)	5				
PHYS 1155 (ND)	3	ENCP 2000	1				
PHYS 1156 (AD)	1	CE fundamentals	4				
PHYS 1157	1	CE fundamentals	5				
	17		**20**		**8**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	ENCP 3000	1	EECE 4791 (EI, CE, WI)[2]	1	Co-op	0
		CE fundamentals	4	ENGW 3302 or 3315 (WD)	4		
		EE fundamentals	4	EECE technical elective	4		
		EECE technical elective	4				
		General elective	4				
	0		**17**		**9**		**0**

Year 4

Fall	Hours	Spring	Hours
Co-op	0	EECE 4792 (EI, CE, WI)[2]	4
		EECE technical elective	4
		EECE technical elective	4
		General elective	4
	0		**16**

Total Hours: 133

FOUR YEARS, TWO CO-OPS IN SPRING/SUMMER 1

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 (ND)	4	GE 1502 (ER)	4	General elective	4	General elective	4
CHEM 1153	0	MATH 1342 (FQ)	4	General elective	4		
ENGW 1111 (WF)	4	PHYS 1151 (ND)	3				
GE 1000	1	PHYS 1152 (AD)	1				
GE 1501	4	PHYS 1153	1				
MATH 1341 (FQ)	4	General elective	4				
	17		**17**		**8**		**4**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
EECE 2140[1]	4	Co-op	0	Co-op	0	EECE 3468	4
EECE 2160	4					General elective	4
ENCP 2000	1						
MATH 2341	4						
PHYS 1155 (ND)	3						
PHYS 1156 (AD)	1						
PHYS 1157	1						
	18		**0**		**0**		**8**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1800 (FQ)	4	Co-op	0	Co-op	0	EECE 4791 (EI, CE, WI)[2]	1
CS 1802	1					ENGW 3302 or 3315 (WD)	4

EECE 2150 (AD)	5					EECE technical elective	4
CE fundamentals	4						
General elective	4						
	18		**0**		**0**		**9**

Year 4

Fall	Hours	Spring	Hours
EECE 4792 (EI, CE, WI)[2]	4	EECE technical elective	4
ENCP 3000	1	EECE technical elective	4
CE fundamentals	4	EECE technical elective	4
CE fundamentals	5	General elective	4
EE fundamentals	4		
	18		**16**

Total Hours: 133

FIVE YEARS, THREE CO-OPS IN SUMMER 2/FALL

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 (ND)	4	GE 1502 (ER)	4	Vacation		Vacation	
CHEM 1153	0	MATH 1342 (FQ)	4				
ENGW 1111 (WF)	4	PHYS 1151 (ND)	3				
GE 1000	1	PHYS 1152 (AD)	1				
GE 1501	4	PHYS 1153	1				
MATH 1341 (FQ)	4	General elective	4				
	17		**17**		**0**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
EECE 2140[1]	4	CS 1800 (FQ)	4	Vacation		Co-op	0
EECE 2160	4	CS 1802	1				
MATH 2341	4	EECE 2150 (AD)	5				
PHYS 1155 (ND)	3	ENCP 2000	1				
PHYS 1156 (AD)	1	CE fundamentals	4				
PHYS 1157	1	General elective	4				
	17		**19**		**0**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	CE fundamentals	5	ENGW 3302 or 3315 (WD)	4	Co-op	0
		CE fundamentals	4	General elective	4		
		EE fundamentals	4				
		General elective	4				
	0		**17**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	ENCP 3000	1	EECE 4791 (EI, WI, CE)[2]	1	Co-op	0
		EECE 3468	4	EECE technical elective	4		
		EECE technical elective	4				
		EECE technical elective	4				
		General elective	4				
	0		**17**		**5**		**0**

Year 5

Fall	Hours	Spring	Hours
Co-op	0	EECE 4792 (EI, WI, CE)[2]	4
		EECE technical elective	4

	General elective	4	
	General elective	4	
	0	**16**	

Total Hours: 133

FIVE YEARS, THREE CO-OPS IN SPRING/SUMMER 1

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 (ND)	4	GE 1502 (ER)	4	Vacation		Vacation	
CHEM 1153	0	MATH 1342 (FQ)	4				
ENGW 1111 (WF)	4	PHYS 1151 (ND)	3				
GE 1000	1	PHYS 1152 (AD)	1				
GE 1501	4	PHYS 1153	1				
MATH 1341 (FQ)	4	General elective	4				
	17		**17**		**0**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
EECE 2140[1]	4	Co-op	0	Co-op	0	Vacation	
EECE 2160	4						
ENCP 2000	1						
MATH 2341	4						
PHYS 1155 (ND)	3						
PHYS 1156 (AD)	1						
PHYS 1157	1						
	18		**0**		**0**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1800 (FQ)	4	Co-op	0	Co-op	0	ENGW 3302 or 3315 (WD)	4
CS 1802	1					General elective	4
EECE 2150 (AD)	5						
CE fundamentals	4						
General elective	4						
	18		**0**		**0**		**8**

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CE fundamentals	4	Co-op	0	Co-op	0	EECE 4791 (EI, WI, CE)[2]	1
CE fundamentals	5					EECE technical elective	4
EE fundamentals	4						
General elective	4						
	17		**0**		**0**		**5**

Year 5

Fall	Hours	Spring	Hours
EECE 4792 (EI, WI, CE)[2]	4	EECE technical elective	4
EECE 3468	4	EECE technical elective	4
ENCP 3000	1	General elective	4
EECE technical elective	4	General elective	4
General elective	4		
	17		**16**

Total Hours: 133

1 Computing Fundamentals for Engineers (EECE 2140) can be taken in year 1 spring instead of a general elective by students who are interested in the course in preparation for co-ops involving programming and computing hardware.

[2] The capstone design courses are taken as follows: Electrical and Computer Engineering Capstone 1 (EECE 4791) in Summer 1 and Electrical and Computer Engineering Capstone 2 (EECE 4792) in Spring or Electrical and Computer Engineering Capstone 1 (EECE 4791) in Summer 2 and Electrical and Computer Engineering Capstone 2 (EECE 4792) in Fall.