Electrical Engineering, BSEE

The components of the Information Age—global communication systems; computers and computer chips, and the software that runs them; as well as pacemakers, magnetic resonance imaging, and interplanetary space missions—are possible because of the efforts of electrical engineers. Today, electrical engineers are developing concepts and working to translate these ideas into the next generation of products, from computers and safe, energy-efficient vehicles, to radar that can detect unexploded land mines from the air, to microrobots that diagnose disease from inside the body.

Many electrical engineers work in the traditional areas of communications, computation, and control and components required to realize such systems. They are involved in design and product development, testing and quality control, sales and marketing, and manufacturing. Others use their problem-solving skills in diverse areas such as bioengineering, healthcare, electronic music, meteorology, and experimental psychology. Some graduates draw on their electrical engineering backgrounds to launch successful careers as physicians, financial analysts, attorneys, and entrepreneurs.

The BSEE degree requires a sequence of core courses and advanced study in one or more technical elective areas: electronic circuits and devices; signals and systems; fields, waves, and optics; power engineering; or computer engineering. General electives and electives in the arts and humanities and social sciences are also required.

Program Requirements

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 (http://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/).

NUpath Requirements

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

NUpath requirements Interpreting Culture (IC), Societies and Institutions (SI), and Differences and Diversity (DD) are not explicitly satisfied by required engineering courses. Students are responsible for satisfying these requirements with general electives.

Engineering

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
Electrical Engineering Fundamentals		
EECE 2412 and EECE 2413	Fundamentals of Electronics and Lab for EECE 2412	5
EECE 2520	Fundamentals of Linear Systems	4
EECE 2530 and EECE 2531	Fundamentals of Electromagnetics and Lab for EECE 2530	5
Computer Engineering Fundamentals		
If more than one computer engineering fundamentals course is taken, it can count as a technical elective.		
Complete one of the following:		4-5
EECE 2322 and EECE 2323	Fundamentals of Digital Design and Computer Organization and Lab for EECE 2322	
EECE 2540	Fundamentals of Networks	
EECE 2560	Fundamentals of Engineering Algorithms	
Electrical Engineering Capstone Courses		
EECE 4791	Electrical and Computer Engineering Capstone 1	1
EECE 4792	Electrical and Computer Engineering Capstone 2	4
Electrical Engineering Technical Electives		
Students can register for EECE4991/EECE4992/EECE4993 more than once. For these courses combined, a maximum of 8SH will be allowed to satisfy the requirement of technical electives. An additional 4SH will be allowed as a general elective. At most one of these courses (4SH) can be taken in a semester.		

Though students may register for EECE 2750 more than once, only 4SH will be allowed to satisfy the requirements of technical electives. An additional 4SH will be allowed as a general elective.

Complete four of the following:		16
EECE 2322 and EECE 2323	Fundamentals of Digital Design and Computer Organization and Lab for EECE 2322	
EECE 2540 to EECE 2750		
EECE 3324 to EECE 3410		
EECE 4512 to EECE 4698		
EECE 4991	Research	
EECE 4992	Directed Study	
EECE 4993	Independent Study	
EECE 5115 to EECE 5698		
ENGR 5670	Sustainable Energy: Materials, Conversion, Storage, and Usage	
Supplemental Credit		
2 semester hours from the following course count toward the engineering requirement:		2
EECE 3468	Noise and Stochastic Processes	
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]	

Supporting Courses: Mathematics/Science

Complete all Mathematics/Science courses with a minimum of 30 semester hours.

Code	Title	Hours
CHEM 1151 and CHEM 1153	General Chemistry for Engineers and Recitation for CHEM 1151	4
MATH 1341	Calculus 1 for Science and Engineering	4
MATH 1342	Calculus 2 for Science and Engineering	4
MATH 2321	Calculus 3 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		
2 semester hours from the following course count toward the mathematics/science requirement:		2
EECE 3468	Noise and Stochastic Processes	
1 semester hour from the following course counts toward the mathematics/science requirement:		1
GE 1501	Cornerstone of Engineering 1 [1]	

Professional Development

Code	Title	Hours
Professional Development		
GE 1000	First-Year Seminar	1
ENCP 2000	Introduction to Engineering Co-op Education	1
ENCP 3000	Professional Issues in Engineering	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 SH of academic, nonremedial, nonrepetitive courses.		28

Major GPA Requirement

Minimum 2.000 GPA required in EECE courses

Program Requirement

133 total semester hours required

[1] Students can substitute GE 1110 and GE 1111 for GE 1501 and 1502 in approved situations.

Plan 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	4	EECE 2160	4	General Elective	4	Co-op	0
EECE 2150 (AD)	5	ENCP 2000	1	General Elective	4		
MATH 2341	4	MATH 2321 (FQ)	4				
PHYS 1155 (ND)	3	EE Fundamentals	5				
PHYS 1156 (AD)	1	EE Fundamentals	4				
PHYS 1157	1						
	18		18		8		0

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	EECE 3468	4	EECE 4791 (EI, CE, WI)	1	Co-op	0
		ENCP 3000	1	ENGW 3302 or 3315 (WD)	4		
		CE Fundamentals	4	EECE Technical Elective	4		
		EE Fundamentals	5				
		EECE Technical Elective	4				
	0		18		9		0

Year 4

Fall	Hours	Spring	Hours
Co-op	0	EECE 4792 (EI, CE, WI)	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	4	Co-op	0	Co-op	0	General Elective	4
EECE 2150 (AD)	5					General Elective	4
ENCP 2000	1						
MATH 2341	4						
PHYS 1155 (ND)	3						
PHYS 1156 (AD)	1						
PHYS 1157	1						
	19		0		0		8

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
EECE 2160	4	Co-op	0	Co-op	0	EECE 4791 (EI, CE, WI)	1
ENCP 3000	1					ENGW 3302 or 3315 (WD)	4
MATH 2321 (FQ)	4					EECE Technical Elective	4
EE Fundamentals	4						
EE Fundamentals	5						
	18		0		0		9

Year 4

Fall	Hours	Spring	Hours
EECE 3468	4	EECE Technical Elective	4
CE Fundamentals	4	EECE Technical Elective	4
EE Fundamentals	5	General Elective	4
EECE 4792	4	EECE Technical Elective	4
	17		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	0	Vacation	0
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	4	EECE 2160	4	Vacation	0	Co-op	0
EECE 2150 (AD)	5	ENCP 2000	1				
MATH 2341	4	MATH 2321 (FQ)	4				
PHYS 1155 (ND)	3	EE Fundamentals	4				
PHYS 1156 (AD)	1	General Elective	4				
PHYS 1157	1						
	18		17		0		0

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	CE Fundamentals	4	ENGW 3302 or 3315 (WD)	4	Co-op	0
		EE Fundamentals	5	General Elective	4		
		EE Fundamentals	5				
		General Elective	4				
	0		18		8		0

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	EECE 3468	4	EECE 4791 (EI, WI, CE)	1	Co-op	0
		ENCP 3000	1	EECE Technical Elective	4		
		EECE Technical Elective	4				
		General Elective	4				
		General Elective	4				
	0		17		5		0

Year 5

Fall	Hours	Spring	Hours
Co-op	0	EECE 4792 (EI, WI, CE)	4
		EECE Technical Elective	4
		EECE Technical 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	0	Vacation	0
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	4	Co-op	0	Co-op	0	Vacation	0
EECE 2150 (AD)	5						
ENCP 2000	1						
MATH 2341	4						
PHYS 1155 (ND)	3						
PHYS 1156 (AD)	1						

PHYS 1157	1						
	19		0		0		0

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
EECE 2160	4	Co-op	0	Co-op	0	ENGW 3302 or 3315 (WD)	4
MATH 2321 (FQ)	4					General Elective	4
EE Fundamentals	4						
General Elective	4						
	16		0		0		8

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ENCP 3000	1	Co-op	0	Co-op	0	EECE 4791 (EI, WI, CE)	1
CE Fundamentals	4					EECE Technical Elective	4
EE Fundamentals	5						
EE Fundamentals	5						
General Elective	4						
	19		0		0		5

Year 5

Fall	Hours	Spring	Hours
EECE 3468	4	EECE Technical Elective	4
EECE 4792 (EI, WI, CE)	4	EECE Technical Elective	4
EECE Technical Elective	4	General Elective	4
General Elective	4	General Elective	4
	16		16

Total Hours: 133

Notes:

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.

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.