Industrial Engineering and Computer Science, BSIE (Boston)

Industrial engineering involves the design and analysis of systems that include people, equipment, and materials and their interactions and performance in the workplace. An industrial engineer collects this information and evaluates alternatives to make decisions that best advance the goals of the enterprise. Computer science is concerned with bringing together all of the intellectual resources needed to enable the rapid and effective development of software to meet the needs of business, research, and end users.

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 (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 may fulfill the EX requirement. Students are responsible for satisfying unfulfilled NUpath requirements with general elective coursework.

Industrial Engineering Requirements

Code	Title	Hours
Required Engineering		
IE 2310 and IE 2311	Introduction to Industrial Engineering and Recitation for IE 2310	4
IE 4510	Simulation Modeling and Analysis	4
IE 4516	Quality Assurance	4
IE 4522 and IE 4523	Human-Machine Systems and Lab for IE 4522	5
IE 4525	Logistics and Supply Chain Management	4
IE 4530 and IE 4531	Manufacturing Systems and Techniques and Lab for IE 4530	5
Senior Capstone Design Project		
MEIE 4701	Capstone Design 1	1
MEIE 4702	Capstone Design 2	5
Supplemental Credit		
1 semester hour from the following counts toward the engineering requirement:		1
IE 3412	Engineering Probability and Statistics	
3 semester hours from the following count toward the engineering requirement:		3
IE 4512	Engineering Economy	
2 semester hours from the following count toward the engineering requirement:		2
IE 4515	Operations Research	
2 semester hours from the following count toward the engineering requirement:		2
IE 4520	Stochastic Modeling	
2 semester hours from the folllowing count toward the engineering requirement:		2
GE 1501	Cornerstone of Engineering 1 [1]	
3 semester hours from the following count toward the engineering requirement:		3
GE 1502	Cornerstone of Engineering 2 [1]	

Computer Science Requirements

Code	Title	Hours
Computer Science Fundamental Courses		
All students can take a self-assessment to attempt to place out of CS 2000 and CS 2001. Students who place out of CS 2000 and CS 2001 will instead substitute 4-5 semester hours of CS, CY, or DS coursework at the 3000 level or higher not otherwise required in the degree.		
CS 1800 and CS 1802	Discrete Structures and Seminar for CS 1800	5
CS 2000 and CS 2001	Introduction to Program Design and Implementation and Lab for CS 2000	5
CS 2100 and CS 2101	Program Design and Implementation 1 and Lab for CS 2100	5
Computer Science Required Courses		
CS 3000	Algorithms and Data	4
CS 3100 and CS 3101	Program Design and Implementation 2 and Lab for CS 3100	5
CS 3650	Computer Systems	4
CS 4530	Fundamentals of Software Engineering	4
or CS 4535	Professional Practicum Capstone	
CS 4700	Network Fundamentals	4
or CS 4730	Distributed Systems	
Khoury Approved Electives		
With advisor approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.		
Complete 4 semester hours from within the following options:		4
CS 2500 or higher, except CS 5010		
CY 2000 or higher		
DS 2500 or higher, except DS 4900		

Supporting Courses: Mathematics/Science

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
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
Supplemental Credit		
3 semester hours from the following count toward the mathematics/science requirement:		3
IE 3412	Engineering Probability and Statistics	
1 semester hour from the following counts toward the mathematics/science requirement:		1
IE 4512	Engineering Economy	
2 semester hours from the following count toward the mathematics/science requirement:		2
IE 4515	Operations Research	
2 semester hours from the following count toward the mathematics/science requirement:		2
IE 4520	Stochastic Modeling	
1 semester hour from the following counts toward the mathematics/science requirement:		1
GE 1501	Cornerstone of Engineering 1 [1]	

Professional Development

Code	Title	Hours
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 counts toward the professional development requirement:		1
GE 1501	Cornerstone of Engineering 1 [1]	
1 semester hour from the following 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 in each course:		
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 8 semester hours of academic, nonremedial, nonrepetitive courses. Recommend selecting courses to fulfill NUpath DD, SI, and IC.		8

Integrative Courses

Code	Title	Hours
This course is already required above and also fulfills the integrative requirement:		
MEIE 4702	Capstone Design 2	

Major GPA Requirement

2.000 minimum GPA required in IE, ME,and MEIE courses

Khoury College GPA Requirement

Minimum cumulative 2.000 GPA required in all CS, CY, DS, and IS courses

Program Requirement

140 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 SECOND HALF/FALL

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 and CHEM 1153	4	CS 1800 and CS 1802	5	CS 2000 and CS 2001	5	General elective	4
ENGW 1111	4	GE 1502	4	MATH 2321	4	General elective	4
GE 1501	4	MATH 1342	4				
GE 1000	1	PHYS 1151 and PHYS 1152 and PHYS 1153	5				
MATH 1341	4						
	17		**18**		**9**		**8**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 2100 and CS 2101	5	ENCP 2000	1	CS 3000 and CS 3001	4	Co-op	0
IE 2310 and IE 2311	4	CS 3100 and CS 3101	5	IE 4512	4		
IE 3412	4	IE 4510	4				
MATH 2341	4	IE 4515	4				
		CS 3650	4				
	17		**18**		**8**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	IE 4520	4	IE 4516	4	Co-op	0
		IE 4522 and IE 4523	5	MEIE 4701	1		
		IE 4525	4	Khoury elective	4		
		IE 4530 and IE 4531	5				
		ENCP 3000	1				
	0		**19**		**9**		**0**

Year 4

Fall	Hours	Spring	Hours
Co-op		CS 4700 or 4730	4
		CS 4530 or 4535	4
		ENGW 3302 or 3315	4
		MEIE 4702	5
	0		**17**

Total Hours: 140

FOUR YEARS, TWO CO-OPS IN SPRING/SUMMER FIRST HALF

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 and CHEM 1153	4	CS 1800 and CS 1802	5	MATH 2321	4	General elective	4
ENGW 1111	4	GE 1502	4	CS 2000 and CS 2001	5	General elective	4
GE 1000	1	MATH 1342	4				
GE 1501	4	PHYS 1151 and PHYS 1152 and PHYS 1153	5				
MATH 1341	4						
	17		**18**		**9**		**8**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ENCP 2000	1	Co-op	0	Co-op	0	CS 3000 and CS 3001	4
CS 2100 and CS 2101	5					ENGW 3302 or 3315	4
IE 2310 and IE 2311	4						
IE 4512	4						
MATH 2341	4						
	18		**0**		**0**		**8**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3100 and CS 3101	5	Co-op	0	Co-op	0	IE 4516	4
IE 3412	4					Khoury elective	4
IE 4515	4						
IE 4530 and IE 4531	5						
ENCP 3000	1						
	19		**0**		**0**		**8**

Year 4

Fall	Hours	Spring	Hours
IE 4520	4	CS 4700 or 4730	4
IE 4522 and IE 4523	5	CS 4530 or 4535	4
IE 4525	4	IE 4510	4
MEIE 4701	1	MEIE 4702	5
CS 3650	4		
	18		**17**

Total Hours: 140

FIVE YEARS, THREE CO-OPS IN SPRING/SUMMER FIRST HALF

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 and CHEM 1153	4	CS 1800 and CS 1802	5	Vacation		Vacation	
ENGW 1111	4	GE 1502	4				
GE 1000	1	MATH 1342	4				
GE 1501	4	PHYS 1151 and PHYS 1152 and PHYS 1153	5				
MATH 1341	4						
	17		**18**		**0**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ENCP 2000	1	Co-op	0	Co-op	0	Vacation	
CS 2000 and CS 2001	5						
IE 2310 and IE 2311	4						
IE 4512	4						
MATH 2321	4						
	18		**0**		**0**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
IE 3412	4	Co-op	0	Co-op	0	CS 3000 and CS 3001	4
CS 2100 and CS 2101	5					ENGW 3302	4
MATH 2341	4						
General elective	4						
	17		**0**		**0**		**8**

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3100 and CS 3101	5	Co-op	0	Co-op	0	IE 4516	4
IE 4515	4					Khoury elective	4
General elective	4						
ENCP 3000	1						
IE 4530 and IE 4531	5						
	19		**0**		**0**		**8**

Year 5

Fall	Hours	Spring	Hours
IE 4520	4	CS 4700 or 4730	4
IE 4522 and IE 4523	5	IE 4510	4
CS 4530 or 4535	4	IE 4525	4
MEIE 4701	1	MEIE 4702	5
CS 3650	4		
	18		**17**

Total Hours: 140

FIVE YEARS, THREE CO-OPS IN SUMMER SECOND HALF/FALL

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 and CHEM 1153	4	CS 1800 and CS 1802	5	Vacation		Vacation	
ENGW 1111	4	GE 1502	4				
GE 1000	1	MATH 1342	4				
GE 1501	4	PHYS 1151 and PHYS 1152 and PHYS 1153	5				
MATH 1341	4						
	17		**18**		**0**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
MATH 2321	4	ENCP 2000	1	Vacation		Co-op	0
CS 2000 and CS 2001	5	CS 2100 and CS 2101	5				
General elective	4	IE 2310 and IE 2311	4				
General elective	4	IE 4512	4				
		MATH 2341	4				
	17		**18**		**0**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	CS 3100 and CS 3101	5	CS 3000 and CS 3001	4	Co-op	0
		IE 3412	4	IE 4516	4		
		IE 4515	4				
		IE 4530 and IE 4531	5				
	0		**18**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	IE 4520	4	ENGW 3302	4	Co-op	0
		CS 4530 or 4535	4	MEIE 4701	1		
		IE 4522 and IE 4523	5	Khoury elective	4		
		ENCP 3000	1				
		CS 3650	4				
	0		**18**		**9**		**0**

Year 5

Fall	Hours	Spring	Hours
Co-op	0	CS 4700 or 4730	4
		IE 4510	4
		IE 4525	4
		MEIE 4702	5
	0		**17**

Total Hours: 140