

Chemical Engineering and Bioengineering, BSChE

The Bachelor of Science in Chemical Engineering and Bioengineering provides students with a broad education built on fundamentals in science, mathematics, and engineering, with the breadth of knowledge and problem solving established in chemical engineering applied through a bioengineering focus. Chemical engineering and bioengineering have long been closely related, working to understand human diseases, developing new therapies and drug delivery systems, and producing new medicines through cell culture techniques. This specific combined major allows for chemical engineering expertise in advanced materials and chemical processes, with the additional specialized bioengineering mastery of the biological constraints intrinsic to supporting and designing systems to aid and repair living systems.

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.

University-Wide Requirements

All undergraduate students are required to complete the University-Wide 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 satisfied by required engineering courses. Students are responsible for satisfying these requirements with general electives.

Chemical Engineering

Code	Title	Hours
Required Engineering		
CHME 2308	Conservation Principles in Chemical Engineering	4
CHME 2310	Transport Processes 1	4
CHME 2320	Chemical Engineering Thermodynamics 1	4
CHME 3312	Transport Processes 2 and Separations	4
CHME 3315 and CHME 3316	Chemical Engineering Experimental Design 1 and Recitation for CHME 3315	4
CHME 3322	Chemical Engineering Thermodynamics 2	4
CHME 4315 and CHME 4316	Chemical Engineering Experimental Design 2 and Recitation for CHME 4315	4
CHME 4510	Chemical Engineering Kinetics	4
CHME 4512	Chemical Engineering Process Control	4

Supplemental Credit

2 semester hours from the following course count toward the engineering requirement:

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	

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

Bioengineering

Code	Title	Hours
Core Bioengineering Courses		
BIOE 2355	Quantitative Physiology for Bioengineers	4
BIOE 3210	Bioelectricity	4
Cell and Tissue Engineering Courses		
BIOE 5410	Molecular Bioengineering	4
BIOE 5420	Cellular Engineering	4
BIOE 5430	Principles and Applications of Tissue Engineering	4
Bioengineering Capstone		
BIOE 4790	Capstone Design 1	4
BIOE 4792	Capstone Design 2	4

Supporting Courses: Mathematics/Science

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

Code	Title	Hours
Required Mathematics/Science		
BIOL 1111	General Biology 1	4
CHEM 1151 and CHEM 1153	General Chemistry for Engineers and Recitation for CHEM 1151	4
CHEM 2311 and CHEM 2312	Organic Chemistry 1 and Lab for CHEM 2311	5
CHEM 2313 and CHEM 2314	Organic Chemistry 2 and Lab for CHEM 2313	5
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

1 semester hour from the following course counts toward the mathematics/science requirement:		1
GE 1501	Cornerstone of Engineering 1 ¹	

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

Professional Development

Code	Title	Hours
GE 1000	Introduction to the Study of Engineering	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:

GE 1501	Cornerstone of Engineering 1 ¹	1
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1 semester hour from the following course counts toward the professional development requirement:

GE 1502	Cornerstone of Engineering 2 ¹	1
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¹ Students can substitute GE 1110 and GE 1111 for GE 1501 and 1502 in approved situations.

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 3307	Advanced Writing in the Sciences	
or ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines	

Required General Electives

Code	Title	Hours
Complete 8 semester hours of academic, nonremedial, nonrepetitive courses.		8

Integrative Courses

Code	Title	Hours
These courses are already required above and also fulfill the integrative requirement.		
CHME 4315	Chemical Engineering Experimental Design 2	4
CHME 4510	Chemical Engineering Kinetics	4

Major GPA Requirement

2.000 minimum GPA required in CHME courses

2.000 minimum GPA required in all BIOE courses

Program Requirement

135 total semester hours required

Plan of Study

Four Years, One Co-op in Summer 2/Fall

Year 1				
Fall	Hours Spring	Hours Summer 1	Hours Summer 2	Hours
CHEM 1151 (ND)	4 BIOL 1111 (ND)	4 MATH 2321 (FQ)	4 Vacation	
CHEM 1153	0 GE 1502 (ER)	4 PHYS 1155 (ND)	3	

ENGW 1111 (WF)	4 MATH 1342 (FQ)	4 PHYS 1156 (AD)	1	
GE 1000	1 PHYS 1151 (ND)	3 PHYS 1157	1	
GE 1501	4 PHYS 1152 (AD)	1		
MATH 1341 (FQ)	4 PHYS 1153	1		
		17	17	9
				0

Year 2

Fall	Hours Spring	Hours Summer 1	Hours Summer 2	Hours
BIOE 2355	4 CHEM 2313	4 Vacation	Vacation	
CHEM 2311 (AD, WI)	4 CHEM 2314	1		
CHEM 2312	1 CHME 2310	4		
CHME 2308	4 CHME 2320	4		
MATH 2341	4 General elective	4		
		17	17	0
				0

Year 3

Fall	Hours Spring	Hours Summer 1	Hours Summer 2	Hours
BIOE 3210	4 BIOE 5410	4 BIOE 4790 (EI, CE, WI)	4 Co-op	
CHME 3312	4 BIOE 5420	4 General elective	4	
CHME 3322	4 CHME 3315 (AD)	4		
ENGW 3302, 3307, or 3315 (WD)	4 CHME 3316	0		
		CHME 4510	4	
		ENCP 2000	1	
		16	17	8
				0

Year 4

Fall	Hours Spring	Hours
Co-op	BIOE 4792 (EI, CE, WI)	4
	BIOE 5430	4
	CHME 4315 (AD, WI)	4
	CHME 4316	0
	CHME 4512	4
	ENCP 3000	1
		0
		17

Total Hours: 135

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 BIOL 1111 (ND)	4 MATH 2321 (FQ)	4 Vacation	
CHEM 1153	0 GE 1502 (ER)	4 PHYS 1155 (ND)	3	
ENGW 1111 (WF)	4 MATH 1342 (FQ)	4 PHYS 1156 (AD)	1	

GE 1000	1	PHYS 1151 (ND)	3	PHYS 1157	1	
GE 1501	4	PHYS 1152 (AD)	1			
MATH 1341 (FQ)	4	PHYS 1153	1			
	17		17		9	0

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
BIOE 2355	4	CHEM 2313	4	Vacation		Co-op	
CHEM 2311 (AD, WI)	4	CHEM 2314	1				
CHEM 2312	1	CHME 2310	4				
CHME 2308	4	CHME 2320	4				
MATH 2341	4	ENCP 2000	1				
		General elective	4				
	17		18		0		0

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		BIOE 3210	4	Vacation		Co-op	
		CHME 3312	4				
		CHME 3322	4				
		ENGW 3302, 3307, or 3315 (WD)	4				
	0		16		0		0

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		BIOE 5410	4	BIOE 4790 (EI, CE, WI)	4	Co-op	
		BIOE 5420	4	General elective	4		
		CHME 3315 (AD)	4				
		CHME 3316	0				
		CHME 4510	4				
		ENCP 3000	1				
	0		17		8		0

Year 5

Fall	Hours	Spring	Hours
Co-op		BIOE 4792 (EI, CE, WI)	4
		BIOE 5430	4
		CHME 4315 (AD, WI)	4
		CHME 4316	0
		CHME 4512	4
	0		16

Total Hours: 135