

Chemical Engineering and Biochemistry, BSCHE

This intercollege combined major serves students who would like to explore their interest in biochemistry while earning the benefit of a Bachelor of Science degree in chemical engineering. The program combines the fundamentals of biochemistry with the engineering skills necessary for scale-up of biochemical processes. Successful graduates will be well-qualified to enter the growing biotechnology industry and be able to converse from the chemistry of organisms to the design of vessels for successful synthesis of cells and pharmaceuticals.

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>).

Major GPA Requirement

2.000 minimum required in CHME courses

Mathematics/Science Requirement

Complete 44 semester hours in mathematics and science as indicated below.

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
BIOL 2301 and BIOL 2302	Genetics and Molecular Biology and Lab for BIOL 2301	5
BIOL 3611 and BIOL 3612	Biochemistry and Lab for BIOL 3611	5
BIOL 4707	Cell and Molecular Biology	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

Advanced Biology Elective

Complete one course in the following range: 4

BIOL 2311 to BIOL 5999

Supplemental Credit

1 semester hour from the following course counts toward the mathematics/science requirement: 1

GE 1502	Cornerstone of Engineering 2
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Advanced Science Requirement

Complete 23 semester hours in advanced science as indicated below.

Code	Title	Hours
BIOL 1115	General Biology 1 for Engineers	4
CHEM 2311 and CHEM 2312 and CHEM 2319	Organic Chemistry 1 and Lab for CHEM 2311 and Recitation for CHEM 2311	5
CHEM 2313 and CHEM 2314 and CHEM 2320	Organic Chemistry 2 and Lab for CHEM 2313 and Recitation for CHEM 2313	5
CHEM 2331 and CHEM 2332	Bioanalytical Chemistry and Lab for CHEM 2331	5

Advanced Chemistry Elective

Complete one course in the following range: 4

CHEM 2310 to CHEM 5999

Engineering

Complete 50 semester hours in engineering as indicated below.

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	Chemical Engineering Experimental Design 1	4
CHME 3322	Chemical Engineering Thermodynamics 2	4
CHME 4315	Chemical Engineering Experimental Design 2	4
CHME 4510	Chemical Engineering Kinetics	4
CHME 4512	Chemical Engineering Process Control	4
CHME 4701	Capstone Design 1: Process Analysis	4
CHME 4703	Capstone Design 2: Chemical Process Design	4

Supplemental Credit

3 semester hours from the following course count toward the engineering requirement: 3

GE 1501	Cornerstone of Engineering 1
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3 semester hours from the following course count toward the engineering requirement: 3

GE 1502	Cornerstone of Engineering 2
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Professional Development

Complete 4 semester hours in professional development as indicated below.

Code	Title	Hours
Professional Development		
GE 1000	Introduction to the Study of Engineering	1
CHME 2000	Introduction to Engineering Co-op Education	1
CHME 3000	Professional Issues in Engineering	1

Additional Required Courses

The remaining credit from the following course will apply to the professional development area:	1
GE 1501	Cornerstone of Engineering 1

Additional NUPATH Courses

Code	Title	Hours
Writing		
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	

NUPATH Requirements Through General Electives

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.

Required General Electives

Complete four academic, nonremedial, nonrepetitive courses, each equivalent to 4 semester hours.

Course Work That Does Not Count Toward the Engineering Degree

Students in engineering are allowed to count a maximum of two pass/fail courses toward their degree program. Only general electives outside the College of Engineering may be taken on a pass/fail grading basis. A maximum of one pass/fail course is allowed per semester.

Program Requirement

145 total semester hours required

Plan of Study

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	MATH 1342 (FQ)	4	CHME 2308	4	Vacation	0
CHEM 1153	0	PHYS 1151 (ND)	3	MATH 2321	4		
ENGW 1111	4	PHYS 1152 (AD)	1				
GE 1000	1	PHYS 1153	1				
GE 1501	4	GE 1502 (ER)	4				
MATH 1341 (FQ)	4	General elective	4				
		17			17		
					8		
						0	

Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
BIOL 1115 (ND)	4	CHEM 2313	4	BIOL 2301 and BIOL 2302	5	Co-op	0
CHEM 2311	4	CHEM 2314	1	General elective	4		
CHEM 2312	1	CHEM 2320	0				
CHEM 2319	0	CHEM 2331 (AD, WI)	4				
CHME 2310	4	CHEM 2332	1				
MATH 2341	4	CHME 2000	1				
		CHME 2320	4				
		General elective	4				
		17			19		
					9		
						0	

Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	CHME 3312	4	BIOL 3611	4	Co-op	0
		CHME 3315 (Chem. Eng. Lab 1)	4	BIOL 3612 (WI)	1		
		CHME 3322	4	General elective	4		
		ENGW 3315	4				
		0			16		
					9		
						0	

Year 4							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	BIOL 4707	4	Vacation	0	Co-op	0
		CHME 3000	1				
		CHME 4315 (Chem.Eng.Lab 2)	4				
		CHME 4510	4				
		CHME 4701	4				
		0			17		
					0		
						0	

Year 5							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	CHME 4512	4				
		CHME 4703 (EI, WI, CE)	4				
		Advanced chemistry elective	4				
		Advanced biology elective	4				
		0			16		

Total Hours: 145