

Chemistry, BS (Boston)

The Bachelor of Science in Chemistry is designed to give students both breadth and depth in chemistry fundamentals. During their course of study, students have an opportunity to develop qualitative and quantitative problem-solving skills as well as effective communication skills. The overall objective of the program is to provide scientific background and laboratory experience for students as they prepare for chemically related careers or advanced study in fields that include both the traditional chemical specialties and other endeavors that draw upon an understanding of the chemical basis of the world around us such as biochemistry, materials science, forensic science, medicine, education, or law.

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/>).

Chemistry Major Requirements

Code	Title	Hours
Introduction to College		
CHEM 1000 or INSC 1000	Chemistry/Chemical Biology at Northeastern Science at Northeastern	1
Experiential Learning Introduction		
EESC 2000	Professional Development for Co-op	1
General Chemistry		
CHEM 1161 and CHEM 1162 and CHEM 1163	General Chemistry for Science Majors and Lab for CHEM 1161 and Recitation for CHEM 1161	5
CHEM 2161 and CHEM 2162 and CHEM 2163	Concepts in Chemistry and Lab for CHEM 2161 and Recitation for CHEM 2161	5
Organic Chemistry		
CHEM 2315 and CHEM 2316 and CHEM 2324	Organic Chemistry 1 for Chemistry Majors and Lab for CHEM 2315 and Recitation for CHEM 2315	6
CHEM 2317 and CHEM 2318 and CHEM 2325	Organic Chemistry 2 for Chemistry Majors and Lab for CHEM 2317 and Recitation for CHEM 2317	6
Analytical Chemistry		
CHEM 2321 and CHEM 2322 and CHEM 2323	Analytical Chemistry and Lab for CHEM 2321 and Recitation for CHEM 2321	5
Physical Chemistry		
CHEM 3401 and CHEM 3402	Chemical Thermodynamics and Kinetics and Lab for CHEM 3401	5
CHEM 3403 and CHEM 3404	Quantum Chemistry and Spectroscopy and Lab for CHEM 3403	5
Biochemistry		
CHEM 5621 and CHEM 5622	Principles of Chemical Biology and Lab for CHEM 5621	4
Inorganic Chemistry		
Complete one of the following:		5

CHEM 3501 and CHEM 3502 and CHEM 3503	Inorganic Chemistry and Lab for CHEM 3501 and Recitation for CHEM 3501	
CHEM 3505 and CHEM 3506 and CHEM 3507	Introduction to Bioinorganic Chemistry and Lab for CHEM 3505 and Recitation for CHEM 3505	

Senior Research/Capstone

CHEM 4750	Senior Research	4
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Supporting Courses

Code	Title	Hours
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Mathematics

MATH 1341	Calculus 1 for Science and Engineering	4
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Complete one of the following:		4
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MATH 1242	Calculus 2	
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MATH 1342	Calculus 2 for Science and Engineering	
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Physics

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
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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
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Writing Requirement

Code	Title	Hours
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College Writing

ENGW 1111 or ENGW 1102	First-Year Writing First-Year Writing for Multilingual Writers	4
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Advanced Writing in the Discipline

ENGW 3307 or ENGW 3315	Advanced Writing in the Sciences Interdisciplinary Advanced Writing in the Disciplines	4
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Concentration or Electives Option

A concentration is not required. Students may complete the electives option in lieu of a concentration. Students working toward a concentration must declare it with their advisor for it to be added to their academic record.

- Chemical Biology (p. 2)
- Materials Chemistry (p. 3)
- Electives Option (p. 3)

CONCENTRATION IN CHEMICAL BIOLOGY

Code	Title	Hours
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Advanced Chemistry

CHEM 4456 and CHEM 4457	Organic Chemistry 3: Organic Chemistry of Drug Design and Development and Lab for CHEM 4456	5
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Complete one of the following:		3
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CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis	
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CHEM 5620	Protein Chemistry	
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CHEM 5625	Chemistry and Design of Protein Pharmaceuticals	
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CHEM 5630	Nucleic Acid Chemistry	
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Additional Supporting Courses

BIOL 1111 and BIOL 1112	General Biology 1 and Lab for BIOL 1111	5
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BIOL 1113 and BIOL 1114	General Biology 2 and Lab for BIOL 1113	5
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BIOL 2301 and BIOL 2302	Genetics and Molecular Biology and Lab for BIOL 2301	5
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CONCENTRATION IN MATERIALS CHEMISTRY

Code	Title	Hours
Advanced Chemistry		
CHEM 4628 and CHEM 4629	Introduction to Spectroscopy of Organic Compounds and Identification of Organic Compounds	6
Complete one of the following:		3-4
CHEM 5610	Polymer Chemistry	
CHEM 5640	Biopolymeric Materials	
Complete one of the following:		3-4
CHEM 5651	Materials Chemistry of Renewable Energy	
CHME 5105	Materials Characterization Techniques	
Additional Supporting Courses		
ME 2340 and ME 2341	Introduction to Material Science and Lab for ME 2340	5

ELECTIVES OPTION

Code	Title	Hours
Advanced Chemistry		
Complete two of the following (one advanced chemistry elective must have an associated lab):		8-11
CHEM 3331 and CHEM 3332	Bioanalytical Chemistry and Lab for CHEM 3331	
CHEM 4456 and CHEM 4457	Organic Chemistry 3: Organic Chemistry of Drug Design and Development and Lab for CHEM 4456	
CHEM 4628 and CHEM 4629	Introduction to Spectroscopy of Organic Compounds and Identification of Organic Compounds	
Students can submit a request to the director of undergraduate studies to replace one advanced chemistry elective with a course from the following:		
CHEM 5550	Introduction to Glycobiology and Glycoprotein Analysis	
CHEM 5610 to CHEM 5620		
CHEM 5625 to CHEM 5627		
CHEM 5629 to CHEM 5700		

Chemistry Major Credit Requirement

Complete a minimum of 76 semester hours in the major.

Program Requirement

134 total semester hours required

Chemistry Major GPA Requirement

A minimum 2.000 GPA in the following course codes is required: CHEM, PHYS, and MATH

NUpath Requirements Satisfied

- Engaging with the Natural and Designed World
- Exploring Creative Expression and Innovation
- Conducting Formal and Quantitative Reasoning
- Analyzing and Using Data
- Writing Across Audiences and Genres
- Demonstrating Thought and Action in a Capstone

Plan of Study**Sample Plans of Study**

Please note that these are sample plans of study. While the requirements are the same for all students, individual schedules may vary.

FOUR YEARS, TWO CO-OPS IN SUMMER SECOND HALF/FALL

Year 1							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1000 or INSC 1000		1 CHEM 2315 and CHEM 2316 and CHEM 2324		6 PHYS 1155 and PHYS 1156 and PHYS 1157		5 Vacation	
CHEM 1161 and CHEM 1162 and CHEM 1163		5 MATH 1342		4 Elective 3		4	
ENGW 1111		4 PHYS 1151 and PHYS 1152 and PHYS 1153		5			
MATH 1341		4 Elective 2		4			
Elective 1		4					
	18		19		9		0
Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 2161 and CHEM 2162 and CHEM 2163		5 CHEM 2321 and CHEM 2322 and CHEM 2323		5 Elective 8		4 Co-op	0
CHEM 2317 and CHEM 2318 and CHEM 2325		6 CHEM 3401 and CHEM 3402		5 Elective 9		4	
Elective 4		4 EESC 2000		1			
Elective 5		4 Elective 6		4			
		Elective 7		4			
	19		19		8		0
Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		0 CHEM 3403 and CHEM 3404		5 Elective 10		4 Co-op	0
		CHEM 3501 and CHEM 3502 and CHEM 3503		5 Elective 11		4	
		ENGW 3307		4			
		CHEM elective		3-6			
	0		17-20		8		0
Year 4							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		0 CHEM 4750		4			
		CHEM 5621 and CHEM 5622		4			
		CHEM elective		5-6			
		Elective 12		4			
	0		17-18				

Total Hours: 134-138

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

Year 1							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1000 or INSC 1000		1 CHEM 2315 and CHEM 2316 and CHEM 2324		6 Vacation		Vacation	
CHEM 1161 and CHEM 1162 and CHEM 1163		5 MATH 1342		4			

ENGW 1111		4	PHYS 1151 and PHYS 1152 and PHYS 1153	5				
MATH 1341		4	Elective 2	4				
Elective 1		4						
		18		19		0		0
Year 2								
Fall	Hours		Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 2161 and CHEM 2162 and CHEM 2163		5	CHEM 2321 and CHEM 2322 and CHEM 2323	5	Vacation		Co-op	0
CHEM 2317 and CHEM 2318 and CHEM 2325		6	EESC 2000	1				
PHYS 1155 and PHYS 1156 and PHYS 1157		5	Elective 4	4				
Elective 3		4	Elective 5	4				
			Elective 6	4				
		20		18		0		0
Year 3								
Fall	Hours		Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		0	CHEM 3401 and CHEM 3402	5	Elective 8	4	Co-op	0
			CHEM 3501 and CHEM 3502 and CHEM 3503	5	Elective 9	4		
			ENGW 3307	4				
			Elective 7	4				
		0		18		8		0
Year 4								
Fall	Hours		Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		0	CHEM 3403 and CHEM 3404	5	Vacation		Co-op	0
			Chemistry elective	3-6				
			Elective 10	4				
			Elective 11	4				
		0		16-19		0		0
Year 5								
Fall	Hours		Spring	Hours				
Co-op		0	CHEM 4750	4				
			CHEM 5621 and CHEM 5622	4				
			Chemistry elective	5-6				
			Elective 12	4				
		0		17-18				
Total Hours: 134-138								