

# Environmental Engineering and Chemical Engineering, BSEnE (Boston)

The Bachelor of Science in Environmental Engineering and Chemical Engineering provides expertise in addressing a variety of environmental challenges built on fundamentals in engineering, chemical, biological, and ecological principles. The coursework is designed to prepare students to tackle interconnected challenges in water, energy, air quality, and related fields through chemical engineering skills in the engineering and control of processes involving chemicals that impact our environment by exploring ways to reduce acid rain and smog; to recycle and reduce wastes; to develop new sources of environmentally clean energy; and to design inherently safe, efficient, and “green” processes.

## 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/>).

All undergraduate students are required to complete the NUpath requirements (<https://nam12.safelinks.protection.outlook.com/?url=https%3A%2F%2Fcatalog.northeastern.edu%2Fundergraduate%2Funiversity-academics%2Fnupath%2F&data=05%7C01%7Cr.ricard%40northeastern.edu%7Ce3274753ff984fdb07bf08daffaca10a%7Ca8eec281aaa34daeac9b9a398b9215e7%7C0%7C0%7C638103414147731111%7CUnknown%7CTWFpbGZsb3d8eyJWljiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6Ikl1haWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=wYBh4JzP83ItTxumo3dgbqSLDLqgDMkOchhJSIkaVG0%3D&reserved=0>).

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.

## Environmental Engineering

Code	Title	Hours
<b>Core Environmental Engineering Courses</b>		
CIVE 2300 and CIVE 2301	Environmental Measurements in Natural and Engineered Systems and Lab for CIVE 2300	4
CIVE 2334	Environmental Engineering: Principles, Technology, and Sustainability	4
CIVE 3435	Environmental Pollution: Fate and Transport	4
CIVE 4534 and CIVE 4535	Water Treatment Systems Design and Lab for CIVE 4534	4
CIVE 4765	Senior Design Project—Environmental	5
<b>Environmental Engineering Elective Courses</b>		
Complete at least three of the following:		12
CIVE 3335	Environmental Engineering Chemistry and Chemical Technologies	
CIVE 4540	Resource Recovery and Waste Treatment Technologies Abroad	
CIVE 4777	Climate Hazards and Resilient Cities Abroad	
CIVE 5100	Equity in Engineering	
CIVE 5150	Climate and Atmospheric Change	
CIVE 5250	Organic Pollutants in the Environment	
CIVE 5255	Tools and Techniques of Environmental Health	
CIVE 5260	Environmental Fluid Mechanics	
CIVE 5261	Dynamic Modeling for Environmental Investment and Policymaking	
CIVE 5271	Solid and Hazardous Waste Management	
CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
CIVE 5280	Remote Sensing of the Environment	
CIVE 5281	Coastal Dynamics and Design	

CIVE 5300 and CIVE 5301	Environmental Sampling and Analysis and Lab for CIVE 5300
CIVE 5363	Climate Science, Engineering Adaptation, and Policy
CIVE 5365	Climate Technologies for Decarbonization, Mitigation, and Adaptation
CIVE 5366	Air Quality Engineering and Science
CIVE 5368	Air Quality Management
CIVE 5369	Atmospheric Boundary Layer Flows
CIVE 5536	Hydrologic and Hydraulic Design
CIVE 5670	Global Biogeochemistry
CIVE 5699	Special Topics in Civil Engineering
GE 3300	Energy Systems: Science, Technology, and Sustainability

**Supplemental Credit**

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

CIVE 3430	Engineering Microbiology and Ecology
or EEMB 3455	Ecosystems Ecology

1 semester hour from the following counts toward the engineering requirement: 1

CIVE 3464	Probability and Engineering Economy for Civil Engineering
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2 semester hours from the following count toward the engineering requirement: 2

GE 1501	Cornerstone of Engineering 1 <sup>1</sup>
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3 semester hours from the following count toward the engineering requirement: 3

GE 1502	Cornerstone of Engineering 2 <sup>1</sup>
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**Chemical Engineering**

Code	Title	Hours
<b>Core Chemical Engineering Courses</b>		
CHME 2308	Conservation Principles in Chemical Engineering	4
CHME 2310	Transport Processes 1	4
CHME 2320	Engineering Thermodynamics	4
CHME 3305 and CHME 3306	Chemical Engineering Laboratory and Recitation for CHME 3305	4
CHME 3312	Transport Processes 2	4
CHME 3322	Chemical Thermodynamics	4
CHME 4510	Chemical Engineering Kinetics	4
CHME 4512	Chemical Engineering Process Control	4
CHME 4701	Separations and Process Analysis	4

**Mathematics/Science**

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

Code	Title	Hours
<b>Required Mathematics/Science</b>		
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
<b>Science Elective (Earth)</b>		
Complete one of the following:		4
ENVR 1200	Dynamic Earth	
ENVR 2200	Earth's Changing Cycles	
ENVR 3125	Global Oceanic Change	

ENVR 3200	Water Resources
ENVR 3600	Oceanography
ENVR 5201	Geologic Field Seminar

**Supplemental Credit**

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

CIVE 3430	Engineering Microbiology and Ecology
or EEMB 3455	Ecosystems Ecology

3 semester hours from the following count toward the mathematics/science requirement: 3

CIVE 3464	Probability and Engineering Economy for Civil Engineering
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1 semester hour from the following counts toward the mathematics/science requirement: 1

GE 1501	Cornerstone of Engineering 1 <sup>1</sup>
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**Professional Development**

Code	Title	Hours
<b>Professional Development</b>		
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 <sup>1</sup>
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1 semester hour from the following counts toward the professional development requirement: 1

GE 1502	Cornerstone of Engineering 2 <sup>1</sup>
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**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 8 semester hours of academic, nonremedial, nonrepetitive courses.		8

**Integrative Courses**

Code	Title	Hours
This course is already required above and also fulfills the integrative requirement.		
CIVE 4765	Senior Design Project—Environmental	

**Major GPA Requirement**

2.000 minimum GPA required in CIVE coursework

**Program Requirement**

133 total semester hours required

<sup>1</sup> Students can substitute Engineering Design (GE 1110 (<https://catalog.northeastern.edu/search/?P=GE%201110>)) and Engineering Problem Solving and Computation (GE 1111 (<https://catalog.northeastern.edu/search/?P=GE%201111>)) for Cornerstone of Engineering 1 (GE 1501 (<https://catalog.northeastern.edu/search/?P=GE%201501>)) and Cornerstone of Engineering 2 (GE 1502 (<https://catalog.northeastern.edu/search/?P=GE%201502>)).

**Plan of Study****Sample Plans of Study****FOUR YEARS, ONE CO-OP IN SUMMER SECOND HALF/FALL****Year 1**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151		4 GE 1502		4 CHME 2308		4 Vacation	
CHEM 1153		0 MATH 1342		4 MATH 2321		4	
ENGW 1111		4 PHYS 1151		3			
GE 1000		1 PHYS 1152		1			
GE 1501		4 PHYS 1153		1			
MATH 1341		4 General elective		4			
	<b>17</b>		<b>17</b>		<b>8</b>		<b>0</b>

**Year 2**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CIVE 2300		2 ENCP 2000		1 ENGW 3302 or 3315		4 Vacation	
CIVE 2301		2 CHME 2320		4 General elective		4	
CIVE 2334		4 CHME 3312		4			
CHME 2310		4 Science elective (Earth)		4			
MATH 2341		4 CIVE 3430		4			
	<b>16</b>		<b>17</b>		<b>8</b>		<b>0</b>

**Year 3**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHME 3305		4 ENCP 3000		1 Vacation		Co-op	0
CHME 3306		0 CHME 4510		4			
CHME 3322		4 CHME 4701		4			
CIVE 3435		4 CIVE 3464		4			
Environmental engineering elective		4 CIVE 4534		3			
		CIVE 4535		1			
	<b>16</b>		<b>17</b>		<b>0</b>		<b>0</b>

**Year 4**

Fall	Hours	Spring	Hours
Co-op		0 CIVE 4765	5
		CHME 4512	4
		Environmental engineering elective	4
		Environmental engineering elective	4
	<b>0</b>		<b>17</b>

**Total Hours: 133****FOUR YEARS, ONE CO-OP IN SPRING/SUMMER FIRST HALF****Year 1**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 (ND)		4 GE 1502 (ER)		4 CHME 2308		4 Vacation	
CHEM 1153		0 MATH 1342 (FQ)		4 MATH 2321 (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			
	<b>17</b>		<b>17</b>		<b>8</b>		<b>0</b>

**Year 2**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHME 2310		4 CHME 2320		4 ENGW 3302 or 3315		4 Vacation	
CIVE 2300 and CIVE 2301		4 CHME 3312		4 General elective		4	
CIVE 2334		4 CIVE 3430		4			
MATH 2341		4 ENCP 2000		1			
		Science elective (Earth)		4			
		<b>16</b>		<b>17</b>		<b>8</b>	<b>0</b>

**Year 3**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHME 3305 and CHME 3306		4 Co-op		0 Co-op		0 Vacation	
CHME 3322		4					
CIVE 3435		4					
Environmental engineering elective		4					
		<b>16</b>		<b>0</b>		<b>0</b>	<b>0</b>

**Year 4**

Fall	Hours	Spring	Hours
CHME 4510		4 CHME 4512	4
CHME 4701		4 CIVE 4765	5
CIVE 4534 (WI)		3 Environmental engineering elective	4
CIVE 4535		1 Environmental engineering elective	4
CIVE 3464		4	
ENCP 3000		1	
		<b>17</b>	<b>17</b>

**Total Hours: 133****FIVE YEARS, THREE CO-OPS IN SUMMER SECOND HALF/FALL****Year 1**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 (ND)		4 GE 1502 (ER)		4 CHME 2308		4 Vacation	
CHEM 1153 (WF)		0 MATH 1342 (FQ)		4 MATH 2321 (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			
		<b>17</b>		<b>17</b>		<b>8</b>	<b>0</b>

**Year 2**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHME 2310		4 CHME 2320		4 General elective		4 Co-op	0
CIVE 2300		2 CHME 3312		4 Environmental engineering elective		4	
CIVE 2301		2 CIVE 3430		4			
CIVE 2334		4 ENCP 2000		1			
MATH 2341		4 Science elective (Earth)		4			
		<b>16</b>		<b>17</b>		<b>8</b>	<b>0</b>

**Year 3**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		0 CHME 3305		4 Vacation		Co-op	0

		CHME 3306	0					
		CHME 3322	4					
		CIVE 3435	4					
		CIVE 3464	4					
		<b>0</b>	<b>16</b>			<b>0</b>		<b>0</b>
<b>Year 4</b>								
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>	<b>Summer 1</b>	<b>Hours</b>	<b>Summer 2</b>	<b>Hours</b>	
Co-op	0	CHME 4510	4	Vacation		Co-op		0
		CHME 4701	4					
		CIVE 4534 (WI)	3					
		CIVE 4535	1					
		ENCP 3000	1					
		ENGW 3302	4					
		<b>0</b>	<b>17</b>			<b>0</b>		<b>0</b>
<b>Year 5</b>								
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>					
Co-op	0	CHME 4512	4					
		CIVE 4765	5					
		Environmental engineering elective	4					
		Environmental engineering elective	4					
		<b>0</b>	<b>17</b>					

Total Hours: 133

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

<b>Year 1</b>								
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>	<b>Summer 1</b>	<b>Hours</b>	<b>Summer 2</b>	<b>Hours</b>	
CHEM 1151 (ND)	4	GE 1502 (ER)	4	CHME 2308	4	Vacation		
CHEM 1153	0	MATH 1342 (FQ)	4	MATH 2321 (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					
	<b>17</b>		<b>17</b>		<b>8</b>			<b>0</b>
<b>Year 2</b>								
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>	<b>Summer 1</b>	<b>Hours</b>	<b>Summer 2</b>	<b>Hours</b>	
CHME 2320	4	Co-op	0	Co-op	0	CIVE 3464		4
CIVE 2300 and CIVE 2301	4					General elective		4
CIVE 2334	4							
ENCP 2000	1							
MATH 2341	4							
	<b>17</b>		<b>0</b>		<b>0</b>			<b>8</b>
<b>Year 3</b>								
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>	<b>Summer 1</b>	<b>Hours</b>	<b>Summer 2</b>	<b>Hours</b>	
CHME 2310	4	Co-op	0	Co-op	0	Vacation		
CHME 3322	4							
CIVE 3430	4							
Science elective (Earth)	4							
	<b>16</b>		<b>0</b>		<b>0</b>			<b>0</b>

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHME 3305		4 Co-op		0 Co-op		0 Vacation	
CHME 3306		0					
CHME 3312		4					
CIVE 3435		4					
ENGW 3302		4					
		16		0		0	0

Fall	Hours	Spring	Hours
CHME 4510		4 CHME 4512	4
CHME 4701		4 CIVE 4765	5
CIVE 4534 (WI)		3 Environmental engineering elective	4
CIVE 4535		1 Environmental engineering elective	4
ENCP 3000		1	
	13		17

**Total Hours: 129**