

# Chemical Engineering and Physics, BSChE

This intercollege combined major serves students who would like to explore their interest in physics while earning the benefit of a Bachelor of Science degree in chemical engineering. Upon completion, the successful student will understand the fundamental physics behind many chemical-based processes, resulting in the ability to design and practice in the field of engineering that deals with the movement of mass, heat transfer, and reactions involved in the processing of various materials.

## Program Requirements

- Concentrations and course offerings may vary by campus and/or by program modality. Please consult with your advisor or admissions coach for the course availability each term at your campus or within your program modality.
- Certain options within the program may be *required* at certain campuses or for certain program modalities. Please consult with your advisor or admissions coach for requirements at your campus or for your program modality.

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

## Engineering Requirements

Code	Title	Hours
<b>Required Engineering</b>		
CHME 2308	Conservation Principles in Chemical Engineering	4
CHME 2310	Transport Processes 1	4
CHME 2320	Chemical 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
PHYS 3600	Advanced Physics Laboratory	4
<b>Chemical Engineering Capstone</b>		
CHME 4703 and CHME 4705	Chemical Process Design Capstone and Recitation for CHME 4703	4
<b>Supplemental Credit</b>		
2 semester hours from the following course count toward the engineering requirement:		2
GE 1501	Cornerstone of Engineering 1 <sup>1</sup>	
3 semester hours from the following course count toward the engineering requirement:		3
GE 1502	Cornerstone of Engineering 2 <sup>1</sup>	

**Mathematics/Science Requirement**

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
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
PHYS 2371 and PHYS 2372	Electronics and Lab for PHYS 2371	4
PHYS 3601	Classical Dynamics	4
PHYS 3602	Electricity and Magnetism 1	4
PHYS 5318	Principles of Experimental Physics	4
<b>Supplemental Credit</b>		
1 semester hour from the following course counts toward the mathematics/science requirement:		1
GE 1501	Cornerstone of Engineering 1 <sup>1</sup>	

**Advanced Science Requirement**

Code	Title	Hours
CHEM 2311 and CHEM 2312	Organic Chemistry 1 and Lab for CHEM 2311	5
PHYS 2303	Modern Physics	4
PHYS 4115	Quantum Mechanics	4
Complete one of the following:		5
CHEM 2313 and CHEM 2314	Organic Chemistry 2 and Lab for CHEM 2313	
CHEM 2317 and CHEM 2318	Organic Chemistry 2 for Chemistry Majors and Lab for CHEM 2317	

**Professional Development**

Code	Title	Hours
<b>Professional Development</b>		
GE 1000	First-Year Seminar	1
ENCP 2000	Introduction to Engineering Co-op Education	1
ENCP 3000	Professional Issues in Engineering	1
<b>Additional Required Courses</b>		
1 semester hour from the following course counts toward the professional development requirement:		1
GE 1501	Cornerstone of Engineering 1 <sup>1</sup>	
1 semester hour from the following course counts toward the professional development requirement:		1
GE 1502	Cornerstone of Engineering 2 <sup>1</sup>	

**Writing Requirements**

Code	Title	Hours
A grade of C or higher is required:		
ENGW 1111	First-Year Writing	4
ENGW 3302 or ENGW 3315	Advanced Writing in the Technical Professions Interdisciplinary Advanced Writing in the Disciplines	4

**Required General Electives**

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

<sup>1</sup> 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).

**Major GPA Requirement**

2.000 minimum required in CHME coursework

**Program Requirement**

135 total semester hours required

**Plan of Study****Sample Plan of Study****FOUR YEARS, ONE CO-OP IN SUMMER 2/FALL**

Year 1									
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours	
CHEM 1151 and CHEM 1153 (ND)		4 CHME 2308		4 MATH 2321 (FQ)		4 Vacation			
ENGW 1111 (WF)		4 GE 1502 (ER)		4 PHYS 1155 and PHYS 1156 and PHYS 1157 (ND)		5			
GE 1000		1 MATH 1342 (FQ)		4					
GE 1501		4 PHYS 1151 and PHYS 1152 and PHYS 1153 (ND)		5					
MATH 1341 (FQ)		4							
		<b>17</b>		<b>17</b>		<b>9</b>		<b>0</b>	
Year 2									
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours	
CHEM 2311 and CHEM 2312		5 CHEM 2313 and CHEM 2314		5 Vacation		Vacation			
CHME 2320		4 CHME 2310		4					
MATH 2341		4 CHME 3322		4					
PHYS 2371 and PHYS 2372 (ND)		4 PHYS 2303 (ND)		4					
		<b>17</b>		<b>17</b>		<b>0</b>		<b>0</b>	
Year 3									
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours	
CHME 3312		4 CHME 4510		4 PHYS 3600 (ND, AD, WI)		4 Co-op		0	
ENGW 3302 or 3315 (WD)		4 CHME 4512		4 General Elective		4			
CHME 3305 and CHME 3306		4 CHME 4701		4					
General Elective		4 ENCP 2000		1					
		PHYS 3601 (ND)		4					
		<b>16</b>		<b>17</b>		<b>8</b>		<b>0</b>	
Year 4									
Fall	Hours	Spring	Hours						
Co-op		0 CHME 4703 and CHME 4705 (EI, CE, WI)		4					
		ENCP 3000		1					
		PHYS 3602 (ND)		4					
		PHYS 4115 (ND, FQ)		4					

		PHYS 5318 (ND, AD, WI, CE)	4				
	0		17				

Total Hours: 135

**FOUR YEARS, ONE CO-OP IN SPRING/SUMMER 1**

Year 1							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 and CHEM 1153 (ND)		4 CHME 2308		4 MATH 2321 (FQ)		4 Vacation	
ENGW 1111 (WF)		4 GE 1502 (ER)		4 PHYS 1155 and PHYS 1156 and PHYS 1157 (ND)		5	
GE 1000		1 MATH 1342 (FQ)		4			
GE 1501		4 PHYS 1151 and PHYS 1152 and PHYS 1153 (ND)		5			
MATH 1341 (FQ)		4					
	17		17		9		0

Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 2311 and CHEM 2312		5 CHEM 2313 and CHEM 2314		5 Vacation		Vacation	
CHME 2320		4 CHME 2310		4			
MATH 2341		4 CHME 3322		4			
PHYS 2371 and PHYS 2372 (ND)		4 PHYS 2303 (ND)		4			
	17		17		0		0

Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHME 3312		4 Co-op		0 Co-op		0 PHYS 3600	4
ENGW 3302 or 3315 (WD)		4				General elective	4
CHME 3305 and CHME 3306		4					
General Elective		4					
ENCP 2000		1					
	17		0		0		8

Year 4							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHME 4510		4 CHME 4703 and CHME 4705 (EI, CE, WI)		4			
CHME 4512		4 ENCP 3000		1			
CHME 4701		4 PHYS 3602 (ND)		4			
PHYS 3601		4 PHYS 4115 (ND, FQ)		4			
		PHYS 5318 (ND, AD, WI, CE)		4			
	16		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 and CHEM 1153 (ND)		4 CHME 2308		4 MATH 2321 (FQ)		4 Vacation	
ENGW 1111 (WF)		4 GE 1502 (ER)		4 PHYS 1155 and PHYS 1156 and PHYS 1157 (ND)		5	
GE 1000		1 MATH 1342 (FQ)		4			

GE 1501	4	PHYS 1151 and PHYS 1152 and PHYS 1153 (ND)	5					
MATH 1341 (FQ)	4							
	<b>17</b>		<b>17</b>		<b>9</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>	<b>Hours</b>
CHEM 2311 and CHEM 2312	5	CHEM 2313 and CHEM 2314	5	Vacation		Co-op		0
CHME 2320	4	CHME 2310	4					
MATH 2341	4	CHME 3322	4					
PHYS 2371 and PHYS 2372 (ND)	4	ENCP 2000	1					
		PHYS 2303 (ND)	4					
	<b>17</b>		<b>18</b>		<b>0</b>			<b>0</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>	<b>Hours</b>
Co-op	0	CHME 3312	4	PHYS 3600 (ND, AD, WI)	4	Co-op	4	0
		ENGW 3302 or 3315 (WD)	4	General Elective	4			
		CHME 3305 and CHME 3306	4					
		PHYS 3601 (ND)	4					
	<b>0</b>		<b>16</b>		<b>8</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>	<b>Hours</b>
Co-op	0	CHME 4510	4	Vacation		Co-op		0
		CHME 4512	4					
		CHME 4701	4					
		ENCP 3000	1					
		PHYS 3602 (ND)	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 4703 and CHME 4705 (EI, CE, WI)	4					
		PHYS 4115 (ND, FQ)	4					
		PHYS 5318 (ND, AD, WI, CE)	4					
		General Elective	4					
	<b>0</b>		<b>16</b>					

Total Hours: 135

### FIVE YEARS, THREE CO-OPS IN SPRING/SUMMER 1

<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>	<b>Hours</b>
CHEM 1151 and CHEM 1153 (ND)	4	CHME 2308	4	MATH 2321 (FQ)	4	Vacation	4	
ENGW 1111 (WF)	4	GE 1502 (ER)	4	PHYS 1155 and PHYS 1156 and PHYS 1157 (ND)	5			
GE 1000	1	MATH 1342 (FQ)	4					
GE 1501	4	PHYS 1151 and PHYS 1152 and PHYS 1153 (ND)	5					
MATH 1341 (FQ)	4							
	<b>17</b>		<b>17</b>		<b>9</b>			<b>0</b>

Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CHEM 2311		4 Co-op		0 Co-op		0 Vacation		
CHEM 2312		1						
CHME 2320		4						
MATH 2341		4						
PHYS 2371 (ND)		3						
PHYS 2372 (EI)		1						
ENCP 2000		1						
		<b>18</b>		<b>0</b>		<b>0</b>		<b>0</b>
Year 3								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CHEM 2313 and CHEM 2314		5 Co-op		0 Co-op		0 PHYS 3600		4
CHME 2310		4				General elective		4
CHME 3322		4						
PHYS 2303		4						
		<b>17</b>		<b>0</b>		<b>0</b>		<b>8</b>
Year 4								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CHME 3312		4 Co-op		0 Co-op		0 Vacation		
ENGW 3302		4						
CHME 3305 and CHME 3306		4						
PHYS 3601		4						
		<b>16</b>		<b>0</b>		<b>0</b>		<b>0</b>
Year 5								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CHME 4510		4 CHME 4703 and CHME 4705 (EI, CE, WI)		4				
CHME 4512		4 PHYS 4115 (ND, FQ)		4				
CHME 4701		4 PHYS 5318 (ND, AD, WI, CE)		4				
ENCP 3000		1 General Elective		4				
PHYS 3602		4						
		<b>17</b>		<b>16</b>				

**Total Hours: 135**

### Notes

#### PHYSICS COURSE OFFERING SCHEDULE

PHYS 2303 offered every fall, spring, and summer 2

PHYS 2371/PHYS 2372 offered every fall

PHYS 3600 offered every summer 1 and summer 2

PHYS 3601 offered every fall and spring

PHYS 3602 offered every fall and spring

PHYS 3603 offered fall, spring all years, and summer 1 (odd years)

PHYS 4115 offered every fall and spring

PHYS 4305 offered fall, spring all years, and summer 2 (even years)

PHYS 4621 offered fall (even years) and spring (odd years)

PHYS 4623 offered fall (even years) and summer 1 (even years)

PHYS 4651 offered fall (odd years) and spring (odd years)

PHYS 4652 offered every spring

PHYS 5318 offered every spring