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

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
Required Engineering		
CHME 2308	Conservation Principles in Chemical Engineering	4
CHME 2310	Transport Processes 1	4
CHME 2320	Chemical Engineering Thermodynamics 1	4
CHME 3305 and CHME 3306	Chemical Engineering Laboratory and Recitation for CHME 3305	4
CHME 3312	Transport Processes 2	4
CHME 3322	Chemical Engineering Thermodynamics 2	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
Chemical Engineering Capstone		
CHME 4703 and CHME 4705	Chemical Process Design Capstone and Recitation for CHME 4703	4
Supplemental Credit		
2 semester hours from the following course count toward the engineering requirement:		2
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]	

Mathematics/Science Requirement

Complete all Mathematics/Science courses with a minimum of 30 semester hours.

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

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
Professional Development		
GE 1000	First-Year Seminar	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:		1
GE 1501	Cornerstone of Engineering 1 [1]	
1 semester hour from the following course counts toward the professional development requirement:		1
GE 1502	Cornerstone of Engineering 2 [1]	

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 SH of academic, nonremedial, nonrepetitive courses.		8

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

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
CHEM 1151 (ND)	4	CHME 2308	4	MATH 2321 (FQ)	4	Vacation	0
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
CHEM 2311	4	CHEM 2313	4	Vacation	0	Vacation	0
CHEM 2312	1	CHEM 2314	1				
CHME 2320	4	CHME 2310	4				
MATH 2341	4	CHME 3322	4				
PHYS 2371 (ND)	3	PHYS 2303 (ND)	4				
PHYS 2372 (EI)	1						
	17		**17**		**0**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	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	4	CHME 4701	4				
CHME 3306	0	ENCP 2000	1				
General Elective	4	PHYS 3601 (ND)	4				
	16		**17**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours
Co-op	0	CHME 4703 (EI, CE, WI)	4
		CHME 4705	0
		ENCP 3000	1
		PHYS 3602 (ND)	4
		PHYS 4115 (ND, FQ)	4
		PHYS 5318 (ND, AD, WI, CE)	4
	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	CHME 2308	4	MATH 2321 (FQ)	4	Vacation	0
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
CHEM 2311	4	CHEM 2313	4	Vacation	0	Co-op	0
CHEM 2312	1	CHEM 2314	1				
CHME 2320	4	CHME 2310	4				
MATH 2341	4	CHME 3322	4				
PHYS 2371 (ND)	3	ENCP 2000	1				
PHYS 2372 (EI)	1	PHYS 2303 (ND)	4				
	17		**18**		**0**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	CHME 3312	4	PHYS 3600 (ND, AD, WI)	4	Co-op	0
		ENGW 3302 or 3315 (WD)	4	General Elective	4		
		CHME 3305	4				
		CHME 3306	0				
		PHYS 3601 (ND)	4				
	0		**16**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	CHME 4510	4	Vacation	0	Co-op	0
		CHME 4512	4				
		CHME 4701	4				
		ENCP 3000	1				
		PHYS 3602 (ND)	4				
	0		**17**		**0**		**0**

Year 5

Fall	Hours	Spring	Hours
Co-op	0	CHME 4703 (EI, CE, WI)	4
		CHME 4705	0
		PHYS 4115 (ND, FQ)	4
		PHYS 5318 (ND, AD, WI, CE)	4
		General Elective	4
	0		**16**

Total Hours: 135

Notes

Physics courses are offered on the following schedule:

- Modern Physics (PHYS 2303) offered every fall, spring and summer 2.
- Electronics (PHYS 2371)/Lab for PHYS 2371 (PHYS 2372) offered every fall.
- Advanced Physics Laboratory (PHYS 3600) offered every summer 1 and summer 2.
- Classical Dynamics (PHYS 3601) is offered fall and spring semesters of even years only. Please meet with your academic advisor to discuss scheduling options for Year 4 of odd years.
- Electricity and Magnetism 1 (PHYS 3602) offered every fall and spring.
- Electricity and Magnetism 2 (PHYS 3603) offered fall (even years) and summer 1 (odd years).
- Quantum Mechanics (PHYS 4115) offered every fall and spring.
- Thermodynamics and Statistical Mechanics (PHYS 4305) offered every spring and summer 2 (even years).
- Biological Physics 1 (PHYS 4621) offered spring (odd years) and fall (even years).
- Medical Physics (PHYS 4623) offered summer 1 and fall (even years).

- Medical Physics Seminar 1 (PHYS 4651) offered spring and fall (odd years).
- Medical Physics Seminar 2 (PHYS 4652) offered every spring.
- Principles of Experimental Physics (PHYS 5318) offered every spring.