Mechanical Engineering and Physics, BSME

This undergraduate program takes advantage of the physical similarities between mechanical engineering and physics, providing students with the opportunity to pursue studies that explore both topics. The program culminates with mechanical engineering capstone design.

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 Requirement

Code	Title	Hours
Required Engineering		
ME 2340 and ME 2341	Introduction to Material Science and Lab for ME 2340	5
ME 2350	Statics	4
ME 2355 and ME 2356	Mechanics of Materials and Lab for ME 2355	5
ME 2380 and ME 2381	Thermodynamics and Recitation for ME 2380	4
ME 3455 and ME 3456	Dynamics and Lab for ME 3455	5
ME 3475	Fluid Mechanics	4
or ME 3480	International Applications of Fluid Mechanics	
ME 4505 and ME 4506	Measurement and Analysis with Thermal Science Application and Lab for ME 4505	5
ME 4508	Mechanical Engineering Computation and Design	4
or ME 4565	Introduction to Computational Fluid Dynamics	
ME 4550	Mechanical Engineering Design	4
ME 4555	System Analysis and Control	4
ME 4570	Thermal Systems Analysis and Design	4
Mechanical Engineering Capstone		
MEIE 4701	Capstone Design 1	1
MEIE 4702	Capstone Design 2	5
Supplemental Credit		
2 semester hours from the following course counts toward the engineering requirement:		2
GE 1501	Cornerstone of Engineering 1 [1]	

3 semester hours from the following course counts toward the engineering requirement:		3
GE 1502	Cornerstone of Engineering 2 [1]	

Mathematics/Science Requirement

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 1161 and PHYS 1162 and PHYS 1163	Physics 1 and Lab for PHYS 1161 and Recitation for PHYS 1161	5
PHYS 1165 and PHYS 1166 and PHYS 1167	Physics 2 and Lab for PHYS 1165 and Recitation for PHYS 1165	5
PHYS 2303	Modern Physics	4
PHYS 2371 and PHYS 2372	Electronics and Lab for PHYS 2371	4
PHYS 3600	Advanced Physics Laboratory	4
PHYS 3601	Classical Dynamics	4
PHYS 3602	Electricity and Magnetism 1	4
PHYS 5318	Principles of Experimental Physics	4
Advanced Physics Elective		
Complete one 4-semester-hour course from the following:		4
PHYS 4606	Mathematical and Computational Methods for Physics	
PHYS 4621	Biological Physics 1	
PHYS 4623	Medical Physics	
PHYS 4651	Medical Physics Seminar 1	
PHYS 4652	Medical Physics Seminar 2	
PHYS 5113	Particle Physics	
PHYS 5116	Network Science 1	
PHYS 5117	Advanced Astrophysics Topics	
PHYS 5118	General Relativity and Cosmology	
PHYS 5125	Advanced Quantum Mechanics	
PHYS 5260	Introduction to Nanoscience and Nanotechnology	
Supplemental Credit		
1 semester hour from the following course counts toward the mathematics/science requirement:		1
GE 1501	Cornerstone of Engineering 1 [1]	

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
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	

Required General Electives

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

Integrative Requirement

Code	Title	Hours
This course is already required above and also fulfills the integrative requirement.		
PHYS 5318	Principles of Experimental Physics	

Major GPA Requirement

2.000 minimum GPA required in IE, ME, and MEIE courses

Program Requirement

139 total semester hours required

[1] Students may 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) .

Plan of Study

Sample Plans 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 and CHEM 1153 (ND)	4	ENGW 1111 (WF)	4	Vacation		Vacation	
GE 1000	1	GE 1502 (ER)	4				
GE 1501	4	MATH 1342 (FQ)	4				
MATH 1341 (FQ)	4	PHYS 1165 and PHYS 1166 and PHYS 1167 (ND)	5				
PHYS 1161 and PHYS 1162 and PHYS 1163 (ND)	5						
	18		**17**		**0**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
MATH 2321 (FQ)	4	ENCP 2000	1	ME 3475 or 3480	4	Vacation	
ME 2340 and ME 2341 (WI)	5	MATH 2341	4	PHYS 3600 (ND, AD, WI)	4		
ME 2350	4	ME 2355 and ME 2356	5				
PHYS 2303 (ND)	4	ME 2380 and ME 2381	4				
		PHYS 3601 (ND)	4				
	17		**18**		**8**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ENGW 3302, 3307, or 3315 (WD)	4	ME 3455 and ME 3456	5	ME 4550	4	Co-op	0
ME 4505 and ME 4506 (AD)	5	ME 4508	4	MEIE 4701 (EI, CE, WI)	1		
PHYS 2371 and PHYS 2372 (ND)	4	ME 4570	4	General elective	4		
General elective	4	PHYS 3602 (ND)	4				
		ENCP 3000	1				
	17		**18**		**9**		**0**

Year 4

Fall	Hours	Spring	Hours
Co-op	0	ME 4555	4
		MEIE 4702 (EI, CE, WI)	5
		PHYS 5318 (ND, AD, WI, CE)	4
		Advanced physics elective	4
	0		**17**

Total Hours: 139

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	4	GE 1502	4	Vacation		Vacation	
GE 1501	4	ENGW 1111	4				
GE 1000	1	MATH 1342	4				
MATH 1341	4	PHYS 1165 and PHYS 1166 and PHYS 1167	5				
PHYS 1161 and PHYS 1162 and PHYS 1163	5						
	18		**17**		**0**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PHYS 2303	4	ENCP 2000	1	ME 3475	4	Vacation	
MATH 2321	4	MATH 2341	4	PHYS 3600	4		
ME 2350	4	ME 2355 and ME 2356	5				
ME 2340 and ME 2341	5	ME 2380 and ME 2381	4				
		PHYS 3601	4				
	17		**18**		**8**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ME 3455 and ME 3456	5	Co-op		Co-op		ME 4550	4
ME 4570	4					MEIE 4701	1
PHYS 2371 and PHYS 2372	4					ENGW 3302, 3307, or 3315	4
General Elective	4						
	17		**0**		**0**		**9**

Year 4

Fall	Hours	Spring	Hours
MEIE 4702	5	PHYS 5318	4
ME 4505 and ME 4506	5	Advanced Physics Elective	4
PHYS 3602	4	ME 4508 or 4565	4
General Elective	4	ME 4555	4
ENCP 3000	1		
	19		**16**

Total Hours: 139

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	ENGW 1111 (WF)	4	Vacation		Vacation	
GE 1000	1	GE 1502 (ER)	4				
GE 1501	4	MATH 1342 (FQ)	4				
MATH 1341 (FQ)	4	PHYS 1165 and PHYS 1166 and PHYS 1167 (ND)	5				
PHYS 1161 and PHYS 1162 and PHYS 1163 (ND)	5						
	18		**17**		**0**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
MATH 2321 (FQ)	4	ENCP 2000	1	Vacation		Co-op	0
MATH 2341	4	ME 2340 and ME 2341 (WI)	5				
ME 2350	4	ME 2355 and ME 2356	5				
PHYS 2371 and PHYS 2372 (ND)	4	ME 2380 and ME 2381	4				
		PHYS 2303 (ND)	4				
	16		**19**		**0**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	ENGW 3302, 3307, or 3315 (WD)	4	ME 3475 or 3480	4	Co-op	0
		ME 3455 and ME 3456	5	PHYS 3600 (ND, AD, WI)	4		
		ME 4508	4				
		PHYS 3602 (ND)	4				
	0		**17**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	ENCP 3000	1	ME 4550	4	Co-op	0
		ME 4505 and ME 4506 (AD)	5	MEIE 4701 (EI, WI, CE)	1		
		ME 4555	4	General elective	4		
		ME 4570	4				
		PHYS 3601 (ND)	4				
	0		**18**		**9**		**0**

Year 5

Fall	Hours	Spring	Hours
Co-op	0	MEIE 4702 (EI, WI, CE)	5
		PHYS 5318 (ND, AD, CE, WI)	4
		Advanced physics elective	4
		General elective	4
	0		**17**

Total Hours: 139

Five Years, Three Co-ops in Spring/Summer 1

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1151 and CHEM 1153	4	ENGW 1111	4	Vacation		Vacation	
GE 1000	1	GE 1502	4				
GE 1501	4	PHYS 1165 and PHYS 1166 and PHYS 1167	5				
MATH 1341	4	MATH 1342	4				
PHYS 1161 and PHYS 1162 and PHYS 1163	5						
	18		**17**		**0**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
MATH 2321 and MATH 2322	4	Co-op		Co-op		Vacation	
MATH 2341 and MATH 2342	4						
PHYS 2371 and PHYS 2372	4						
ME 2350	4						
ENCP 2000	1						
	17		**0**		**0**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ME 2340 and ME 2341	5	Co-op		Co-op		ME 3475	4
ME 2355 and ME 2356	5					PHYS 3600	4
ME 2380 and ME 2381	4						
PHYS 2303	4						
	18		**0**		**0**		**8**

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PHYS 3602	4	Co-op		Co-op		ME 4550	4
ME 3455 and ME 3456	5					MEIE 4701	1
ME 4570	4					General Elective	4
ENGW 3302, 3307, or 3315	4						
	17		**0**		**0**		**9**

Year 5

Fall	Hours	Spring	Hours
MEIE 4702	5	ME 4555	4
ENCP 3000	1	PHYS 5318	4
ME 4505 and ME 4506	5	Advanced Physics Elective	4
ME 4508 or 4565	4	General Elective	4
PHYS 3601	4		
	19		**16**

Total Hours: 139

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