

Physics, BS (Boston)

The physics program provides a strong foundation in classical and modern physics, including studies of the various physical phenomena such as electromagnetism, dynamics, building blocks of matter, energy, and radiation.

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/>).

Physics Major Requirements

Code	Title	Hours
Introductory Physics		
<i>Physics 1</i>		
Complete one of the following:		5
PHYS 1151 and PHYS 1152 and PHYS 1153	Physics for Engineering 1 and Lab for PHYS 1151 and Interactive Learning Seminar for PHYS 1151	
PHYS 1161 and PHYS 1162	Physics 1 and Lab for PHYS 1161	
PHYS 1191 and PHYS 1192	Foundations of Theoretical Physics and Lab for PHYS 1191	
<i>Physics 2</i>		
Complete one of the following:		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	
PHYS 1165 and PHYS 1166	Physics 2 and Lab for PHYS 1165	
Intermediate Physics		
PHYS 2303	Modern Physics	4
PHYS 2371 and PHYS 2372	Electronics and Lab for PHYS 2371	4
Advanced Physics		
PHYS 3600	Advanced Physics Laboratory	4
PHYS 3601	Classical Dynamics	4
PHYS 3602	Electricity and Magnetism 1	4
PHYS 3603	Electricity and Magnetism 2	4
PHYS 4115	Quantum Mechanics	4
PHYS 4305	Thermodynamics and Statistical Mechanics	4
Elective Course		
Complete one of the following:		4
MATH 4606	Mathematical and Computational Methods for Physics	
PHYS 3500 to PHYS 7999		

Experiential Learning

Complete one course in experiential learning. See department for approved courses. Note: The experiential learning requirement is waived following a student presentation connected with a co-op and/or research experience. The requirement is often fulfilled by a talk at a Society of Physics Students meeting but can be fulfilled by an adequately documented presentation at a professional meeting or at an appropriate campus event. Contact your faculty advisor for additional information.

Senior Capstone

PHYS 5318	Principles of Experimental Physics	4
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Supporting Courses

Code	Title	Hours
Introduction to College		
INSC 1000	Science at Northeastern	1
Experiential Learning Introduction		
EESC 2000	Professional Development for Co-op	1
Writing Requirements		
ENGW 1111 or ENGW 1102	First-Year Writing First-Year Writing for Multilingual Writers	4
ENGW 3307 or ENGW 3315	Advanced Writing in the Sciences Interdisciplinary Advanced Writing in the Disciplines	4
Mathematics		
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 2331	Linear Algebra	4
MATH 2341	Differential Equations and Linear Algebra for Engineering	4
MATH 3081	Probability and Statistics	4
Computational Methods		
PHYS 1211 or PHYS 1130 or GE 1111	Computational Problem Solving in Physics Computing, Data, and Science Engineering Problem Solving and Computation	4
Chemistry		
CHEM 1211 and CHEM 1212	General Chemistry 1 and Lab for CHEM 1211	5
Technical Electives		
Complete 8 semester hours from the following:		8
BIOL 2301 to BIOL 5999		
CHEM 2311 to CHEM 5999		
CHME 2001 to CHME 4699		
CIVE 2001 to CIVE 4699		
CS 2990 to CS 4900		
EECE 2001 to EECE 5999		
ENVR 2300 to ENVR 5999		
IE 2001 to IE 4699		
MATH 2280	Statistics and Software	
MATH 2321 to MATH 5999		
ME 2001 to ME 4699		
PHYS 2303 to PHYS 7999		

NUPath Requirements

The following NUPath Requirements are met by the major:

- Analyzing and Using Data (AD)
- Conducting Formal and Quantitative Reasoning (FQ)
- Demonstrating Thought and Action in a Capstone (CE)
- Engaging with the Natural and Designed World (ND)
- Exploring Creative Expression and Innovation (EI)

Other NUPath requirements may be fulfilled by electives in the program.

Physics Major Credit Requirement

Complete 91 semester hours in the major.

Science GPA Requirement (Physics)

A minimum 2.000 GPA in the following course codes is required: PHYS.

Astrophysics Concentration (Optional)

Students working toward this concentration must declare it with their advisor for it to be added to their academic record.

Note: *Opting to take this concentration may require additional coursework to be completed beyond the total program hours.*

Code	Title	Hours
Astrophysics Core		
PHYS 1111	Introduction to Astronomy	4
The following courses may be counted toward major electives, if they are listed as applicable options in the approved curriculum:		
PHYS 3111	Astrophysical Processes: Decoding the Universe	4
PHYS 4111	Multimessenger Astrophysics	4
PHYS 5117 or PHYS 5118	Advanced Astrophysics Topics General Relativity and Cosmology	4

Program Requirement

133 total semester hours required

Plan of Study

Note on Physics Plans of Study

Some required physics courses are offered in both fall and spring semesters, while other required courses are offered less frequently. Therefore, the suggested plan of study will vary from student to student, **depending on the year of entry for that student**. See *course offering schedule at the end of the plan of study*.

Please contact your academic advisor for additional information and plans of study.

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

Year 1							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PHYS 1000		1 PHYS 1165		4 Vacation		Vacation	
PHYS 1161	4	PHYS 1166		1			
PHYS 1162	1	PHYS 1167		0			
PHYS 1163	0	PHYS 1211		4			
MATH 1341	4	MATH 1342		4			
ENGW 1111	4	Elective		4			
Elective	4						
	18		17		0		0
Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PHYS 2303		4 PHYS 3601		4 Vacation		Co-op	0
PHYS 2371	3	MATH 2331		4			
PHYS 2372	1	MATH 2341		4			
MATH 2321	4	Elective		4			
CHEM 1211	4	EESC 2000		1			
CHEM 1212	1						
CHEM 1213	0						
	17		17		0		0
Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	PHYS 3602		4 PHYS 3600		4 Co-op	0
		MATH 3081		4 PHYS 3603		4	

		Elective		4				
		Elective		4				
		0		16		8		0
Year 4								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	
Co-op	0	PHYS 4115		4 Technical elective		4 Co-op		0
		PHYS 4305		4 Elective		4		
		ENGW 3307		4				
		Elective		4				
		0		16		8		0
Year 5								
Fall	Hours	Spring	Hours					
Co-op	0	PHYS 5318		4				
		PHYS advanced elective		4				
		Technical elective		4				
		Elective		4				
		0		16				

Total Hours: 133

ODD-NUMBERED YEAR ONE
FOUR YEARS, TWO CO-OPS IN SPRING/SUMMER FIRST HALF

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	
PHYS 1000	1	PHYS 1165		4 MATH 2321		4 MATH 2331		4
PHYS 1161	4	PHYS 1166		1 Elective		4 MATH 2341		4
PHYS 1162	1	PHYS 1167		0				
PHYS 1163	0	MATH 1342		4				
MATH 1341	4	PHYS 1211		4				
ENGW 1111	4	CHEM 1211		4				
Elective	4	CHEM 1212		1				
		CHEM 1213		0				
		18		18		8		8
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	
PHYS 2303	4	Co-op		0 Co-op		0 PHYS 3600		4
PHYS 2371	3					Elective		4
PHYS 2372	1							
PHYS 3602	4							
Elective	4							
EESC 2000	1							
		17		0		0		8
Year 3								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	
PHYS 3601	4	Co-op		0 Co-op		0 MATH 3081		4
PHYS 3603	4					Elective		4
Elective	4							
Elective	4							
		16		0		0		8
Year 4								
Fall	Hours	Spring	Hours					
PHYS 4115	4	PHYS 5318		4				
PHYS 4305	4	PHYS advanced elective		4				

ENGW 3307	4 Technical elective	4
Technical elective	4 Elective	4
	16	16

Total Hours: 133

PHYSICS COURSE OFFERING SCHEDULE

PHYS 2303 offered every fall, spring, and summer second half

PHYS 2371/PHYS 2372 offered every fall

PHYS 3600 offered every summer first half and summer second half

PHYS 3601 offered every fall and spring

PHYS 3602 offered every fall and spring

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

PHYS 4115 offered every fall and spring

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

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

PHYS 4623 offered fall (even years) and summer first half (even years)

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

PHYS 4652 offered every spring

PHYS 5318 offered every spring