

Applied Physics, BS

The applied physics BS degree is a flexible, interdisciplinary-oriented program designed to provide students with a solid background in basic physics, in conjunction with the opportunity to sample courses from a wide range of disciplines, including engineering, biology, chemistry, math, environmental studies, and computer science. This program seeks to enable students to prepare for a variety of careers in, for example, nanotechnology, a medical field, environmental research, or even finance.

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/>).

Applied 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 3602	Electricity and Magnetism 1	4
PHYS 3603	Electricity and Magnetism 2	4
PHYS 4305	Thermodynamics and Statistical Mechanics	4
Advanced Physics Electives		

Complete three of the following: 12

MATH 4606	Mathematical and Computational Methods for Physics
PHYS 3601	Classical Dynamics
PHYS 4115	Quantum Mechanics
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

Experiential Learning

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.

PHYS 4996	Experiential Education Directed Study	4
-----------	---------------------------------------	---

Senior Capstone

PHYS 5318	Principles of Experimental Physics	4
-----------	------------------------------------	---

Supporting Courses

Code	Title	Hours
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
Computational Methods		
PHYS 1211	Computational Problem Solving in Physics	4
or PHYS 1130	Computing, Data, and Science	
or GE 1111	Engineering Problem Solving and Computation	
Chemistry		
CHEM 1211 and CHEM 1212	General Chemistry 1 and Lab for CHEM 1211	5

Technical Electives

Complete 16 semester hours of technical electives from the following: 16

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

Students are responsible for using the general electives in this program to complete NUpath requirements not satisfied by required courses in this program.

Applied Physics Major Credit Requirement

Complete 95 semester hours in the major.

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
<i>The following courses may be counted toward major electives, if they are listed as applicable options in the approved curriculum:</i>		
PHYS 3111	Astrophysical Processes: Decoding the Universe	4
PHYS 4111	Multimessenger Astrophysics	4
PHYS 5117	Advanced Astrophysics Topics	4
or PHYS 5118	General Relativity and Cosmology	

Program Requirement

133 total semester hours required

Plan of Study

Note on Applied Physics Sample 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.

Four Years, Two Co-ops in Summer 2/Fall

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
INSC 1000		1 PHYS 1165		4 MATH 2321		4 MATH 2341		4
PHYS 1161		4 PHYS 1166		1 Elective		4 Elective		4
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			8
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
PHYS 2303		4 PHYS 4305		4 PHYS 3600		4 Co-op		0
PHYS 2371		3 PHYS 3602		4 PHYS 3603		4		
PHYS 2372		1 Elective		4				
MATH 2331		4 Elective		4				
CHEM 1211		4 EESC 2000		1				
CHEM 1212		1						
CHEM 1213		0						
		17			17			8
Year 3								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
Co-op		0 PHYS advanced elective		4 Technical elective		4 Co-op		0
		PHYS advanced elective		4 Elective		4		

		ENGW 3307	4				
		Technical elective	4				
	0		16		8		0
Year 4							
Fall	Hours	Spring	Hours				
Co-op	0	PHYS 5318	4				
		PHYS advanced elective	4				
		Technical elective	4				
		Technical elective	4				
	0		16				

Total Hours: 133

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

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	Co-op	0	Co-op	0	MATH 2341	4
PHYS 2371	3					PHYS 4305	4
PHYS 2372	1						
MATH 2321	4						
CHEM 1211	4						
CHEM 1212	1						
CHEM 1213	0						
EESC 2000	1						
	18		0		0		8
Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PHYS 3602	4	Co-op	0	Co-op	0	PHYS 3600	4
MATH 2331	4					Elective	4
Technical elective	4						
Technical elective	4						
	16		0		0		8
Year 4							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ENGW 3307	4	Co-op	0	Co-op	0	Vacation	
Technical elective	4						
Technical elective	4						
Elective	4						
	16		0		0		0
Year 5							
Fall	Hours	Spring	Hours				
PHYS 3603	4	PHYS 5318	4				
Elective	4	PHYS advanced elective	4				

Elective	4 PHYS advanced elective	4
Elective	4 PHYS advanced elective	4
	16	16

Total Hours: 133

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