

# 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

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 (<http://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/>).

## NUPath Requirements

All undergraduate students are required to complete the NUPath Requirements (<http://catalog.northeastern.edu/undergraduate/university-academics/nupath/>).

## Applied Physics Major Requirements

Code	Title	Hours
<b>Introductory Physics</b>		
<i>Physics 1</i>		
Complete one of the following:		5
PHYS 1161 and PHYS 1162	Physics 1 and Lab for PHYS 1161	
PHYS 1151 and PHYS 1152 and PHYS 1153	Physics for Engineering 1 and Lab for PHYS 1151 and Interactive Learning Seminar for PHYS 1151	
<i>Physics 2</i>		
Complete one of the following:		5
PHYS 1165 and PHYS 1166	Physics 2 and Lab for PHYS 1165	
PHYS 1155 and PHYS 1156 and PHYS 1157	Physics for Engineering 2 and Lab for PHYS 1155 and Interactive Learning Seminar for PHYS 1155	
<b>Intermediate Physics</b>		
PHYS 2303	Modern Physics	4
PHYS 2371 and PHYS 2372	Electronics and Lab for PHYS 2371	4
<b>Advanced Physics</b>		
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
<b>Advanced Physics Electives</b>		
Complete three of the following:		12
PHYS 3601	Classical Dynamics	
PHYS 4115	Quantum Mechanics	
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 4621	Biological Physics 1	
PHYS 4623	Medical Physics	

## 2 Applied Physics, BS

PHYS 4651	Medical Physics Seminar 1	
PHYS 4652	Medical Physics Seminar 2	
PHYS 5260	Introduction to Nanoscience and Nanotechnology	
MATH 4606	Mathematical and Computational Methods for Physics	

### 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
<b>Mathematics</b>		
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
<b>Computational Methods</b>		
PHYS 1211 or PHYS 1130 or GE 1111	Computational Problem Solving in Physics Computing, Data, and Science Engineering Problem Solving and Computation	4
<b>Chemistry</b>		
CHEM 1211 and CHEM 1212	General Chemistry 1 and Lab for CHEM 1211	5
<b>Technical Electives</b>		
Complete 16 semester hours of technical electives from the following:		16
MATH 2280	Statistics and Software	
MATH 2321 to MATH 5999		
PHYS 2303 to PHYS 7999		
CHEM 2311 to CHEM 5999		
BIOL 2301 to BIOL 5999		
ENVR 2300 to ENVR 5999		
CS 2990 to CS 4900		
CHME 2001 to CHME 4699		
CIVE 2001 to CIVE 4699		
EECE 2001 to EECE 5999		
ME 2001 to ME 4699		
IE 2001 to IE 4699		

## Applied Physics Major Credit Requirement

Complete 91 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
<b>Astrophysics Core</b>		
PHYS 1111	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 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 Spring/Summer 1

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
PHYS 1000		1 PHYS 1165		4 Vacation		0 Vacation		0
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	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	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	Hours
ENGW 3307		4 Co-op		0 Co-op		0 Vacation		0
Technical elective	4							
Technical elective	4							
Elective	4							
	16			0		0		0
Year 5								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
PHYS 3603		4 PHYS 5318		4				

4 Applied Physics, BS

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

Total Hours: 133

- PHYS 2303 offered every fall, spring, and summer 2
- PHYS 2371/2372 offered every fall
- PHYS 3600 offered every summer 1 and summer 2
- PHYS 3601 offered spring and fall (even years)
- PHYS 3602 offered every fall and spring
- PHYS 3603 offered fall (even years) and summer 1 (odd years)
- PHYS 4115 offered every fall and spring
- PHYS 4305 offered every spring and summer 2 (even years)
- PHYS 4621 offered spring (odd years) and fall (even years)
- PHYS 4623 offered summer 1 and fall (even years)
- PHYS 4651 offered spring and fall (odd years)
- PHYS 4652 offered every spring
- PHYS 5318 offered every spring