Biomedical Physics, BS (Boston)

The BS Biomedical Physics program seeks to prepare students to understand the role of physical processes occurring on molecular, cellular, or macroscopic scales; in vital biological functions, ranging from the interaction of chemicals with DNA, to the extraction of oxygen from red blood cells, to the generation of complex electrical signals in the brain and nervous system; and physical principles of medical devices. Students following PreMed and PreHealth Advising (https://catalog.northeastern.edu/undergraduate/university-academics/premedical-preprofessional-health-career-preparation/) guidance can use the elective areas of the program's plan of study to complete such courses.

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/).

Biomedical Physics Major Requirements

Code	Title	Hours
Introductory Physics		
Physics 1		
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	
PHYS 1191 and PHYS 1192	Foundations of Theoretical Physics and Lab for PHYS 1191	
Physics 2		
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	
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
Biomedical Physics		
PHYS 4621	Biological Physics 1	4
PHYS 4623	Medical Physics	4
PHYS 4651	Medical Physics Seminar 1	4
PHYS 4652	Medical Physics Seminar 2	4
Advanced Physics Elective		
Complete one course not already required in the following range:		4
MATH 4606	Mathematical and Computational Methods for Physics	

PHYS 3000 to PHYS 7999		
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.		4
PHYS 4996	Experiential Education Directed Study	4
Senior Capstone		
PHYS 5318	Principles of Experimental Physics	4

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	First-Year Writing	4
or ENGW 1102	First-Year Writing for Multilingual Writers	
ENGW 3307	Advanced Writing in the Sciences	4
or ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines	
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 2341	Differential Equations and Linear Algebra for Engineering	4
Computational Methods		
PHYS 1211	Computational Problem Solving in Physics	4
or PHYS 3211	Advanced Computational Problem Solving in Physics	
Biology		
BIOL 1111 and BIOL 1112	General Biology 1 and Lab for BIOL 1111	5
BIOL 1113 and BIOL 1114	General Biology 2 and Lab for BIOL 1113	5
Chemistry		
CHEM 1211 and CHEM 1212	General Chemistry 1 and Lab for CHEM 1211	5
Technical Electives		
Complete two of 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.

Biomedical Physics Major Credit Requirement

Complete 97 semester hours in the major.

Science GPA Requirement (Physics)

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

Program Requirement

135 total semester hours required

Plan of Study

Additional Recommended Courses for Premedical School Track

In addition to the required courses for the BS in Biomedical Physics, students who are pursuing the premed/health track are encouraged to enroll in the following courses, utilizing available elective slots:

Code	Title	Hours
BIOL 2301 and BIOL 2302	Genetics and Molecular Biology and Lab for BIOL 2301	5
BIOL 3611 and BIOL 3612	Biochemistry and Lab for BIOL 3611	5
CHEM 1214 and CHEM 1215 and CHEM 1216	General Chemistry 2 and Lab for CHEM 1214 and Recitation for CHEM 1214	5
CHEM 2311 and CHEM 2312	Organic Chemistry 1 and Lab for CHEM 2311	5
CHEM 2313 and CHEM 2314	Organic Chemistry 2 and Lab for CHEM 2313	5
MATH 2280	Statistics and Software	4

Note on Biomedical 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 SECOND HALF/FALL

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
INSC 1000	1	PHYS 1165	4	MATH 2321	4	PHYS 2303	4
ENGW 1111	4	PHYS 1166	1	Elective	4	MATH 2341	4
MATH 1341	4	PHYS 1167	0				
PHYS 1161	4	MATH 1342	4				
PHYS 1162	1	PHYS 1211	4				
PHYS 1163	0	BIOL 1113	4				
BIOL 1111	4	BIOL 1114	1				
BIOL 1112	1						
	19		**18**		**8**		**8**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PHYS 2371	3	EESC 2000	1	PHYS 3600	4	Co-op	0

PHYS 2372	1	PHYS 3602	4	Elective	4		
CHEM 1211	4	Technical Elective	4				
CHEM 1212	1	Elective	4				
CHEM 1213	0	Elective	4				
Elective	4						
Elective	4						
	17		**17**		**8**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0.0	PHYS 3603	4	ENGW 3307	4	Co-op	0
		PHYS 4305	4	PHYS 4623	4		
		PHYS advanced elective	4				
		Technical Elective	4				
	0		**16**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours
Co-op	0	PHYS 4621	4
		PHYS 4651	4
		PHYS 4652	4
		PHYS 5318	4
	0		**16**

Total Hours: 135

FIVE YEARS, THREE CO-OPS IN SPRING/SUMMER FIRST HALF

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
INSC 1000	1	PHYS 1165	4	Vacation	0	Vacation	0
ENGW 1111	4	PHYS 1166	1				
MATH 1341	4	PHYS 1167	0				
PHYS 1161	4	MATH 1342	4				
PHYS 1162	1	PHYS 1211	4				
PHYS 1163	0	BIOL 1113	4				
BIOL 1111	4	BIOL 1114	1				
BIOL 1112	1						
	19		**18**		**0**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PHYS 2303	4	Co-op	0	Co-op	0	Vacation	0
PHYS 2371	3						
PHYS 2372	1						
MATH 2321	4						
CHEM 1211	4						
CHEM 1212	1						
CHEM 1213	0						
EESC 2000	1						
	18		**0**		**0**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PHYS 4621	4	Co-op	0	Co-op	0	MATH 2341	4
PHYS 4623	4					PHYS 3600	4
Technical elective	4						

Elective	4						
	16		**0**		**0**		**8**

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
PHYS 3602	4	Co-op	0	Co-op	0	PHYS 4305	4
PHYS 4651	4					Elective	4
Technical elective	4						
Elective	4						
	16		**0**		**0**		**8**

Year 5

Fall	Hours	Spring	Hours
PHYS 3603	4	PHYS 4652	4
ENGW 3307	4	PHYS 5318	4
Elective	4	PHYS advanced elective	4
Elective	4	Elective	4
	16		**16**

Total Hours: 135

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