

# Computer Science and Physics, BS (Boston)

The computer science and physics combined major brings together three disciplines: computer science, physics, and mathematics. The mathematics requirements serve as a foundation for both computer science and physics. From hands-on experience with sophisticated physics instruments, to mathematical theory, to the latest computational innovations, our interdisciplinary approach will prepare students for the myriad challenges in today's rapidly changing world.

## 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/>).

## Computer Science Courses

Code	Title	Hours
<b>Computer Science Overview</b>		
CS 1200	First Year Seminar	1
CS 1210	Professional Development for Khoury Co-op	1

### Computer Science Fundamental Courses

All students can take a self-assessment to attempt to place out of CS 2000 and CS 2001. Students who place out of CS 2000 and CS 2001 will instead substitute with 4-5 semester hours of CS, CY, or DS coursework at the 3000 level or higher not otherwise required in the degree.

CS 1800 and CS 1802	Discrete Structures and Seminar for CS 1800	5
CS 2000 and CS 2001	Introduction to Program Design and Implementation and Lab for CS 2000	5
CS 2100 and CS 2101	Program Design and Implementation 1 and Lab for CS 2100	5
CS 2800	Logic and Computation	4

### Computer Science Required Courses

CS 3000	Algorithms and Data	4
CS 3100 and CS 3101	Program Design and Implementation 2 and Lab for CS 3100	5
CS 3800	Theory of Computation	4
CS 4530 or CS 4535	Fundamentals of Software Engineering Professional Practicum Capstone	4

## Physics Courses

Code	Title	Hours
<b>Required Courses</b>		
<b>Introductory Physics</b>		
<i>Physics 1</i>		
Complete one of the following:		5
PHYS 1161 and PHYS 1162 and PHYS 1163	Physics 1 and Lab for PHYS 1161 and Recitation for PHYS 1161	
PHYS 1191 and PHYS 1192 and PHYS 1193	Foundations of Theoretical Physics and Lab for PHYS 1191 and Recitation for PHYS 1191	

*Physics 2*

PHYS 1165 and PHYS 1166 and PHYS 1167	Physics 2 and Lab for PHYS 1165 and Recitation for PHYS 1165	5
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**Intermediate Physics**

PHYS 2303	Modern Physics	4
PHYS 2371 and PHYS 2372	Electronics and Lab for PHYS 2371 (Integrative course)	4

**Advanced Physics**

PHYS 3600	Advanced Physics Laboratory	4
PHYS 3602	Electricity and Magnetism 1	4
PHYS 4305	Thermodynamics and Statistical Mechanics	4

**Capstone and Electives**

Code	Title	Hours
<b>Capstone</b>		
PHYS 5318	Principles of Experimental Physics	4

**Khoury Approved Electives**

With advisor approval, a directed study, research, project study, or appropriate graduate-level course may also be taken as a computer science elective.

Complete 4 semester hours from within the following options: 4

CS 2500 or higher, except CS 5010	
CY 2000 or higher, except CY 4930	
DS 2500 or higher, except DS 4900	
MKTG 4606	Digital, Analytics, Technology, and Automation Research Practicum

**Physics Elective**

Complete one course in the following range: 4

PHYS 3000 to PHYS 5999

**Integrative Courses**

Code	Title	Hours
<b>Calculus</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
<b>Additional Mathematics Requirements</b>		
MATH 2341	Differential Equations and Linear Algebra for Engineering	4
MATH 3081	Probability and Statistics	4

**Supporting Course**

Code	Title	Hours
Complete one of the following: 4		
AFCS 2600	Issues in Race, Science, and Technology	
CY 4170	The Law, Ethics, and Policy of Data and Digital Technologies	
CY 5240	Cyberlaw: Privacy, Ethics, and Digital Rights	
DS 1300	Knowledge in a Digital World	
or PHIL 1300	Knowledge in a Digital World	
HIST 2220	History of Technology	
INSH 2102	Bostonography: The City through Data, Texts, Maps, and Networks	
JRNL 3700	Data Storytelling	
PHIL 1145	Technology and Human Values	
SOCL 1280	The Twenty-First-Century Workplace	
SOCL 2485	Environment, Technology, and Society	

## Computer Science Writing Requirement

Code	Title	Hours
<b>College Writing</b>		
ENGW 1111	First-Year Writing	4
or ENGW 1102	First-Year Writing for Multilingual Writers	
<b>Advanced Writing in the Disciplines</b>		
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 24 semester hours of general electives.		24

## Khoury College GPA Requirement

Minimum cumulative 2.000 GPA required in all CS, CY, DS, and IS courses

## NUpath Requirements Satisfied

- Engaging with the Natural and Designed World
- Exploring Creative Expression and Innovation
- Conducting Formal and Quantitative Reasoning
- Analyzing and Using Data
- Writing in the First Year
- Advanced Writing in the Disciplines
- Writing-Intensive in the Major
- Demonstrating Thought and Action in a Capstone

Integrating Knowledge and Skills Through Experience is satisfied through co-op.

## Program Requirement

135 total semester hours required

## Plan of Study

### Sample Plan of Study

#### FOUR YEARS, TWO CO-OPS IN SUMMER SECOND HALF/FALL

Year 1							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1200		1 CS 2100 and CS 2101		5 CS 3000		4 Elective	4
CS 1800 and CS 1802		5 ENGW 1111		4 MATH 2321		4 Elective	4
CS 2000 and CS 2001		5 MATH 1342		4			
MATH 1341		4 PHYS 1165 and PHYS 1166		5			
PHYS 1161 and PHYS 1162		5					
	20		18		8		8
Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3100 and CS 3101		5 CS 1210		1 Elective		4 Co-op	0
MATH 2341		4 CS 2800		4 Elective		4	
PHYS 2371 and PHYS 2372		4 PHYS 2303		4			
Elective		4 PHYS 3602		4			

4 Computer Science and Physics, BS (Boston)

		Computing and Social Issues		4			
17		17		8		0	
Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	CS 3800	4	PHYS 3600	4	Co-op	0
		MATH 3081	4	ENGW 3302, 3307, or 3315	4		
		PHYS 4305	4				
		Physics Elective	4				
0		16		8		0	
Year 4							
Fall	Hours	Spring	Hours				
Co-op	0	CS 4530 or 4535	4				
		PHYS 5318	4				
		Khoury Elective	4				
		Elective	4				
0		16					

**Total Hours: 136**

**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