

Computer Science and Physics, BS

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 (<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/>).

Computer Science Courses

Code	Title	Hours
Computer Science Overview		
CS 1200	First Year Seminar	1
CS 1210	Professional Development for Khoury Co-op	1
Computer Science Fundamental Courses		
CS 1800 and CS 1802	Discrete Structures and Seminar for CS 1800	5
CS 2500 and CS 2501	Fundamentals of Computer Science 1 and Lab for CS 2500	5
CS 2510 and CS 2511	Fundamentals of Computer Science 2 and Lab for CS 2510	5
CS 2800	Logic and Computation	4
Computer Science Required Courses		
CS 3000	Algorithms and Data	4
CS 3500 and CS 3501	Object-Oriented Design and Lab for CS 3500	5
CS 3800	Theory of Computation	4
CS 4500 or CS 4530	Software Development Fundamentals of Software Engineering	4

Physics Courses

Code	Title	Hours
Required Courses		
PHYS 1161 and PHYS 1162	Physics 1 and Lab for PHYS 1161	5
PHYS 1165 and PHYS 1166	Physics 2 and Lab for PHYS 1165	5
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
Capstone		
Complete either one computer science capstone or the physics capstone:		4
<i>Computer Science Capstone</i>		
CS 4100	Artificial Intelligence	
CS 4150	Game Artificial Intelligence	
CS 4300	Computer Graphics	
CS 4410	Compilers	
CS 4550	Web Development	
<i>Physics Capstone</i>		
PHYS 5318	Principles of Experimental Physics	
Khoury Elective		
The computer science elective is not required if the student has completed the computer science capstone (above). With adviser approval, a directed study, research, project study, or appropriate graduate-level course may also be taken as a computer science elective.		
Complete 4 credits of CS, CY, DS, or IS classes that are not already required. Choose courses within the following ranges:		4
CS 2500 or higher, except CS 5010		
CY 2000 or higher, except CY 4930		
DS 2500 or higher, except DS 4900		
IS 2000 or higher, except IS 4900		
Physics Elective		
Only one physics elective is required if the student has completed the physics capstone (above).		
Complete two courses in the following range:		8
PHYS 3000 to PHYS 5999		

Integrative Courses

Code	Title	Hours
Calculus		
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
Additional Mathematics Requirements		
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
AFAM 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	
ENGL 2150	Literature and Digital Diversity	
HIST 2220	History of Technology	
INSH 2102	Bostonography: The City through Data, Texts, Maps, and Networks	
IS 1300	Knowledge in a Digital World	
or PHIL 1300	Knowledge in a Digital World	
PHIL 1145	Technology and Human Values	
SOCL 1280	The Twenty-First-Century Workplace	
SOCL 2485	Environment, Technology, and Society	
SOCL 4528	Computers and Society	

Computer Science Writing Requirement

Code	Title	Hours
College Writing		
ENGW 1111	First-Year Writing	4
Advanced Writing in the Disciplines		
ENGW 3302 or ENGW 3307 or ENGW 3315	Advanced Writing in the Technical Professions Advanced Writing in the Sciences Interdisciplinary Advanced Writing in the Disciplines	4

Required General Electives

Code	Title	Hours
Complete 24 credits of general electives.		24

Khoury College GPA Requirement

Minimum 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 2/Fall**

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CS 1200		1 CS 2510 and CS 2511		5 CS 3500 and CS 3501		5 Vacation		
CS 1800 and CS 1802		5 ENGW 1111		4 MATH 2321		4		
CS 2500 and CS 2501		5 MATH 1342		4				
MATH 1341		4 PHYS 1165		4				
PHYS 1161		4 PHYS 1166		1				
PHYS 1162		1						
		20			18			9
								0
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CS 2800		4 CS 1210		1 Elective		4 Co-op		
MATH 2341		4 CS 3000		4 Elective		4		
PHYS 2303		4 PHYS 3602		4				
PHYS 2371		3 PHYS 4305		4				
PHYS 2372		1 Computing and social issues		4				
		16			17			8
								0

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Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		CS 3800		4 PHYS 3600		4 Co-op	
		CS or PHYS capstone		4 Elective		4	
		PHYS elective if CS capstone (Khoury elective if PHYS capstone)		4			
		Elective		4			
	0		16			8	0
Year 4							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		CS 4500		4 Elective		4	
		ENGW 3302		4 Elective		4	
		MATH 3081		4			
		PHYS elective		4			
	0		16			8	

Total Hours: 136

- Modern Physics (PHYS 2303) offered every fall, spring, and summer 2
- Electronics (PHYS 2371)/Lab for PHYS 2371 (PHYS 2372) offered every fall
- Advanced Physics Laboratory (PHYS 3600) offered every summer 1 and summer 2
- Classical Dynamics (PHYS 3601) offered spring and fall (even years)
- Electricity and Magnetism 1 (PHYS 3602) offered every fall and spring
- Electricity and Magnetism 2 (PHYS 3603) offered fall (even years) and summer 1 (odd years)
- Quantum Mechanics (PHYS 4115) offered every fall and spring
- Thermodynamics and Statistical Mechanics (PHYS 4305) offered every spring and summer 2 (even years)
- Biological Physics 1 (PHYS 4621) offered spring (odd years) and fall (even years)
- Medical Physics (PHYS 4623) offered summer 1 and fall (even years)
- Medical Physics Seminar 1 (PHYS 4651) offered spring and fall (odd years)
- Medical Physics Seminar 2 (PHYS 4652) offered every spring
- Principles of Experimental Physics (PHYS 5318) offered every spring