

# Computer Science, BSCS

The Bachelor of Science in Computer Science focuses on the fundamentals of program design, software development, computer organization, systems and networks, theories of computation, principles of languages, and advanced algorithms and data. The bachelor's degree in computer science is also offered with a concentration in cyber operations.

## 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.

## University-Wide Requirements

All undergraduate students are required to complete the University-Wide 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/npupath>).

## Computer Science Major Requirements

Code	Title	Hours
<b>Computer Science Overview</b>		
CS 1200	Leadership Skill Development	1
CS 1210	Professional Development for CCIS Co-op	1
<b>Computer Science Fundamental Courses</b>		
A grade of C– or higher is required in 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 and CS 2801	Logic and Computation and Lab for CS 2800	5
<b>Computer Science Required Courses</b>		
CS 3000	Algorithms and Data	4
CS 3500	Object-Oriented Design	4
CS 3650	Computer Systems	4
CS 3700	Networks and Distributed Systems	4
CS 3800	Theory of Computation	4
CS 4400	Programming Languages	4
CS 4500 and CS 4501	Software Development and Recitation for CS 4500	4
<b>Presentation Requirement</b>		
THTR 1170	The Eloquent Presenter	1
<b>Computer Science Capstone</b>		
Complete one of the following:		4-5
CS 4100	Artificial Intelligence	

CS 4300	Computer Graphics
CS 4410	Compilers
CS 4150	Game Artificial Intelligence
CS 4550	Web Development
CS 4991	Research
IS 4900	Information Science Senior Project

## Computer Science Elective Courses

With advisor approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.

Complete 8 credits of CS, IS or DS classes that are not already required. Choose courses within the following ranges:

CS 2500 or higher, except CS 5010
IS 2000 or higher, except IS 4900
DS 2000 or higher, except DS 4900

## Supporting Courses

Code	Title	Hours
<b>Mathematics Courses</b>		
MATH 1341	Calculus 1 for Science and Engineering (a grade of C– or higher is required)	4
MATH 1342	Calculus 2 for Science and Engineering (a grade of C– or higher is required)	4
MATH 2331	Linear Algebra	4
MATH 3081	Probability and Statistics	4
<b>Computing and Social Issues</b>		
Complete one of the following:		4
ANTH 3418	Wired/Unwired: Cybercultures and Technopolitics	
IA 5240	Cyberlaw: Privacy, Ethics, and Digital Rights	
INSH 2102	Bostonography: The City through Data, Texts, Maps, and Networks	
PHIL 1145	Technology and Human Values	
SOCL 1280	The 21st-Century Workplace	
SOCL 3485	Environment, Technology, and Society	
SOCL 4528	Computers and Society	
<b>Electrical Engineering</b>		
EECE 2160	Embedded Design: Enabling Robotics	4
<b>Science Requirement</b>		
Complete two courses for one of the following science categories:		10
<i>Biology</i>		
BIOL 1111 and BIOL 1112	General Biology 1 and Lab for BIOL 1111	
Then complete one of the following:		
BIOL 1113 and BIOL 1114	General Biology 2 and Lab for BIOL 1113	
BIOL 2301 and BIOL 2302	Genetics and Molecular Biology and Lab for BIOL 2301	
<i>Chemistry</i>		

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CHEM 1211 and CHEM 1212 and CHEM 1213	General Chemistry 1 and Lab for CHEM 1211 and Recitation for CHEM 1211
CHEM 1214 and CHEM 1215 and CHEM 1216	General Chemistry 2 and Lab for CHEM 1214 and Recitation for CHEM 1214

*Geology/Environmental Science (Option 1)*

ENVR 1200 and ENVR 1201	Dynamic Earth and Lab for ENVR 1200
ENVR 1202 and ENVR 1203	History of Earth and Life and Interpreting Earth History

*Geology/Environmental Science (Option 2)*

ENVR 1200 and ENVR 1201	Dynamic Earth and Lab for ENVR 1200
Then complete one of the following:	
ENVR 2310 and ENVR 2311	Earth Materials and Lab for ENVR 2310
ENVR 2340 and ENVR 2341	Earth Landforms and Processes and Lab for ENVR 2340
ENVR 3300 and ENVR 3301	Geographic Information Systems and Lab for ENVR 3300
ENVR 4500 and ENVR 4501	Applied Hydrogeology and Lab for ENVR 4500

*Geology/Environmental Science (Option 3)*

ENVR 1202 and ENVR 1203	History of Earth and Life and Interpreting Earth History
ENVR 5242 and ENVR 5243	Ancient Marine Life and Lab for ENVR 5242

*Physics*

Complete one of the following sequences:

Sequence A	
PHYS 1145 and PHYS 1146	Physics for Life Sciences 1 and Lab for PHYS 1145
PHYS 1147 and PHYS 1148	Physics for Life Sciences 2 and Lab for PHYS 1147
Sequence B	
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 1155 and PHYS 1156 and PHYS 1157	Physics for Engineering 2 and Lab for PHYS 1155 and Interactive Learning Seminar for PHYS 1155
Sequence C	
PHYS 1161 and PHYS 1162 and PHYS 1163	Physics 1 and Lab for PHYS 1161 and Recitation for PHYS 1161
PHYS 1165 and PHYS 1166 and PHYS 1167	Physics 2 and Lab for PHYS 1165 and Recitation for PHYS 1165

**Computer Science Writing Requirement**

Code	Title	Hours
<b>College Writing</b>		
ENGW 1111	First-Year Writing	4
<b>Advanced Writing in the Disciplines</b>		

ENGW 3302	Advanced Writing in the Technical Professions	4
or ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines	

**Required General Electives**

Code	Title	Hours
Complete eight general electives.		32

**Major GPA Requirement**

Minimum 2.000 GPA required in all CS and IS courses

**Computer Science Credit Requirements**

Complete 60 semester hours in the major. Acceptable courses for this requirement include all CS courses (except CS 5010) and IS 2000 and higher (except IS 4900).

**NUpath Requirements Satisfied**

- Engaging with the Natural and Designed World
- 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 Patterns:**

**Four Years, Two Co-ops in Spring/Summer 1**

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	
CS 1200	1	CS 2510 and CS 2511	5	CS 3500	4	Elective	4	
CS 1800 and CS 1802	5	CS 2800 and CS 2801	5	Elective	4	MATH 1342	4	
CS 2500 and CS 2501	5	MATH 1341	4					
ENGW 1111 Elective	4	Elective	4					
		19			18			8
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	
CS 3650	4	Co-op		Co-op		MATH 3081	4	
CS 3000	4					Elective	4	
Elective	4							
Elective	4							
CS 1210	1							
		17			0			0
Year 3								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	
CS 3700	4	Co-op		Co-op		MATH 2331	4	

CS 3800	4	ENGW 3302	4
Science elective with lab	5		
THTR 1170	1		
Computing and social issues	4		
	18	0	0
			8

**Year 4**

Fall	Hours	Spring	Hours
CS 4400	4	CS 4500 and CS 4501	4
EECE 2160	4	Computer science capstone	4
Science elective with lab	5	Elective	4
Computer science elective	4	Computer science elective	4
	17		16

Total Hours: 137

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

**Year 1**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1200	1	CS 2510 and CS 2511	5	Vacation	0	Vacation	0
CS 1800 and CS 1802	5	CS 2800 and CS 2801	5				
CS 2500 and CS 2501	5	Elective	4				
ENGW 1111	4	Elective	4				
Elective	4						
	19		18		0		0

**Year 2**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3500	4	Co-op	0	Co-op	0	Vacation	0
MATH 1341	4						
CS 3000	4						
Elective	4						
CS 1210	1						
	17		0		0		0

**Year 3**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3800	4	Co-op	0	Co-op	0	MATH 2331	4
CS 3650	4					Elective	4
MATH 1342	4						
Science elective with lab	5						
THTR 1170	1						
	18		0		0		8

**Year 4**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3700	4	Co-op	0	Co-op	0	Elective	4
MATH 3081	4					Elective	4
ENGW 3302	4						
Science elective with lab	5						
	17		0		0		8

**Year 5**

Fall	Hours	Spring	Hours
CS 4400	4	CS 4500 and CS 4501	4
EECE 2160	4	Computing and social issues	4
CS undergraduate elective	4	Capstone	4
CS undergraduate elective	4	Elective	4
	16		16

Total Hours: 137