Computer Science, BSCS (Boston)

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.

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 Requirements

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		
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 4-5 SH 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
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 3650	Computer Systems	4
CS 3800	Theory of Computation	4
CS 4530	Fundamentals of Software Engineering	4
or CS 4535	Professional Practicum Capstone	
DS 3000	Foundations of Data Science	4
Security Required Course		
Complete one of the following:		4
CY 2550	Foundations of Cybersecurity	
CY 3740	Systems Security	
CY 4740	Network Security	
Presentation Requirement		
Complete one of the following:		4
COMM 1112	Public Speaking	
COMM 1113	Business and Professional Speaking	
COMM 1210	Persuasion and Rhetoric	
COMM 1511	Communication and Storytelling	
THTR 1125	Improvisation	
THTR 1130	Introduction to Acting	
THTR 1180	Dynamic Presence: Theatre Training for Effective Interpersonal Interactions	

THTR 2345	Acting for the Camera
Khoury Approved Electives	
Complete 8 semester hours from within the following options:	
With advisor approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.	
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

Computer Science Concentrations

Pick one of the following concentrations and complete four courses in that concentration. In all concentrations, up to one Research (CS 4991) course can be substituted with college approval. Any missing prerequisites or NUpath requirements must be taken using computer science or general electives.

- Artificial Intelligence (p. 4)
- Foundations (p. 4)
- Human-Centered Computing (p. 4)
- Software (p. 5)
- Systems (p. 5)

Supporting Courses

Code	Title	Hours
Mathematics Courses		
MATH 1341	Calculus 1 for Science and Engineering	4
MATH 1365	Introduction to Mathematical Reasoning	4
or MATH 1465	Intensive Mathematical Reasoning	
Computing and Social Issues		
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	
SOCL 4528	Technology and Society	
Electrical Engineering		
EECE 2310 and EECE 2311	Introduction to Digital Design and Computer Architecture and Lab for EECE 2310	5
Science Requirement		
Complete any two courses (and any required labs). Courses may be taken from different categories:		8
Biology		
BIOL 1111 and BIOL 1112	General Biology 1 and Lab for BIOL 1111	
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	
Chemistry		
CHEM 1161 and CHEM 1162	General Chemistry for Science Majors and Lab for CHEM 1161	

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	
ENVR 1200 and ENVR 1201	Dynamic Earth and Lab for ENVR 1200
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
Mathematics	
MATH 1342	Calculus 2 for Science and Engineering
MATH 2280	Statistics and Software
MATH 2331	Linear Algebra
MATH 3081	Probability and Statistics
Physics	
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
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
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
College Writing		
ENGW 1111	First-Year Writing	4
Advanced Writing in the Disciplines		
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 28 semester hours of general electives.		28

Khoury College GPA Requirement

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

Computer Science Credit Requirement

Complete 72 semester hours in the major.

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

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

Program Requirement

134 total semester hours required

CONCENTRATION IN ARTIFICIAL INTELLIGENCE

Code	Title	Hours
CS 4100	Artificial Intelligence	4
DS 4400	Machine Learning and Data Mining 1	4
Complete two of the following not already taken:		8
CS 4120	Natural Language Processing	
CS 4150	Game Artificial Intelligence	
CS 4180	Reinforcement Learning	
CS 4220	Information Retrieval	
CS 4610	Robotic Science and Systems	
CY 4100	AI Security and Privacy	
DS 4420	Machine Learning and Data Mining 2	
DS 4440	Practical Neural Networks	

CONCENTRATION IN FOUNDATIONS

Code	Title	Hours
Complete two of the following:		8-9
CS 2800	Logic and Computation	
or CS 4820	Computer-Aided Reasoning	
CS 4805	Fundamentals of Complexity Theory	
or CS 4810	Advanced Algorithms	
Complete two of the following not already taken:		8
CS 3950 and CS 4950 and CS 4950	Introduction to Computer Science Research and Computer Science Research Seminar and Computer Science Research Seminar	
CS 4805	Fundamentals of Complexity Theory	
CS 4810	Advanced Algorithms	
CS 4820	Computer-Aided Reasoning	
CS 4830	System Specification, Verification, and Synthesis	
CY 4770	Foundations of Cryptography	

CONCENTRATION IN HUMAN-CENTERED COMPUTING

Code	Title	Hours
CS 2484	Principles of Human-Computer Interaction	4
CS 3484	GUI Programming	4
Complete two of the following not already taken:		8
CS 4097	Mixed Reality	
CS 4350	Empirical Research Methods	
CS 4520	Mobile Application Development	
CS 4550	Web Development	

DS 4200	Information Presentation and Visualization
HINF 5300	Personal Health Interface Design and Development

CONCENTRATION IN SOFTWARE

Code	Title	Hours
CS 2800	Logic and Computation	4
CS 4400	Programming Languages	4
CS 4700	Network Fundamentals	4
or CS 4730	Distributed Systems	
Complete one of the following not already taken:		
CS 3520	Programming in C++	
CS 4410	Compilers	
CS 4520	Mobile Application Development	
CS 4550	Web Development	
CS 4700	Network Fundamentals	
CS 4730	Distributed Systems	
CS 4820	Computer-Aided Reasoning	
CS 4830	System Specification, Verification, and Synthesis	

CONCENTRATION IN SYSTEMS

Code	Title	Hours
CS 4700	Network Fundamentals	4
or CS 4730	Distributed Systems	
Complete one of the following not already taken:		4
CY 3740	Systems Security	
CY 4740	Network Security	
Complete two of the following not already taken:		8
CS 3520	Programming in C++	
CS 4300	Computer Graphics	
CS 4360	Non-Interactive Computer Graphics	
CS 4610	Robotic Science and Systems	
CS 4700	Network Fundamentals	
CS 4730	Distributed Systems	
CY 3740	Systems Security	
CY 4740	Network Security	
CY 4760	Security of Wireless and Mobile Systems	

Plan of Study

Sample Plan of Study: Four Years, Two Co-ops in Spring/Summer First Half

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1200	1	CS 2100 and CS 2101	5	CS 3100 and CS 3101	5	General Elective	4
CS 1800 and CS 1802	5	MATH 1341	4	General Elective	4	General Elective	4
CS 2000 and CS 2001	5	General Elective	4				
ENGW 1111	4	Science Requirement	4				
MATH 1365 or 1465	4						
	19		**17**		**9**		**8**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1210	1	Co-op	0	Co-op	0	EECE 2310 and EECE 2311	5
CS 3000	4					General Elective	4

CS 3650	4						
DS 3000	4						
Science Requirement	4						
	17		**0**		**0**		**9**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3800	4	Co-op	0	Co-op	0	ENGW 3302 or 3315	4
Computing and Social Issues	4					General Elective	4
Concentration Course	4						
Concentration Course	4						
	16		**0**		**0**		**8**

Year 4

Fall	Hours	Spring	Hours
Concentration Course	4	CS 4530 or 4535	4
Khoury Elective	4	Concentration Course	4
Presentation Requirement	4	General Elective	4
Security Course	4	Khoury Elective	4
	16		**16**

Total Hours: 135

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	General Elective	4
CS 1800 and CS 1802	5	MATH 1341	4	General Elective	4	General Elective	4
CS 2000 and CS 2001	5	General Elective	4				
ENGW 1111	4	Science Requirement	4				
MATH 1365 or 1465	4						
	19		**17**		**8**		**8**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3100 and CS 3101	5	CS 1210	1	EECE 2310 and EECE 2311	5	Co-op	0
DS 3000	4	CS 3650	4	General Elective	4		
Concentration Course	4	Concentration Course	4				
Science Requirement	4	Khoury Elective	4				
		Presentation Requirement	4				
	17		**17**		**9**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	Concentration Course	4	ENGW 3302 or 3315	4	Co-op	0
		General Elective	4	General Elective	4		
		Khoury Elective	4				
		Security Course	4				
	0		**16**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours
Co-op	0	CS 3800	4
		CS 4530 or 4535	4

	Computing and Social Issues	4
	Concentration Course	4
0		**16**

Total Hours: 135