Computer Science, BACS

The Bachelor of Arts in Computer Science offers a similar curriculum to the BS, with slightly fewer CS requirements to allow students to study a foreign language and have a wider choice of electives.

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/).

Requirements for BA

All BA students are required to complete the BA requirements (http://catalog.northeastern.edu/undergraduate/university-academics/nupath/ba-requirements/).

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		
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 2810	Mathematics of Data Models	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 3650	Computer Systems	4
CS 3800	Theory of Computation	4
CS 4500	Software Development	4
or CS 4530	Fundamentals of Software Engineering	
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 2345	Acting for the Camera	

Khoury Elective Courses

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

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 advisor approval.

ARTIFICIAL INTELLIGENCE CONCENTRATION

Code	Title	Hours
CS 4100	Artificial Intelligence	4
DS 4400	Machine Learning and Data Mining 1	4
Complete two of the following classes not already taken:		8
CS 4120	Natural Language Processing	
CS 4150	Game Artificial Intelligence	
CS 4610	Robotic Science and Systems	
DS 4420	Machine Learning and Data Mining 2	
IS 4200	Information Retrieval	
PSYC 3466	Cognition	

FOUNDATIONS CONCENTRATION

Code	Title	Hours
CS 2800	Logic and Computation	4
or CS 4820	Computer-Aided Reasoning	
CS 4805	Fundamentals of Complexity Theory	4
or CS 4810	Advanced Algorithms	
Complete two of the following classes 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	Cryptography	

HUMAN-CENTERED COMPUTING CONCENTRATION

Code	Title	Hours
IS 4300	Human Computer Interaction	4
IS 4800	Empirical Research Methods	4
Complete two of the following classes not already taken:		8
CS 4120	Natural Language Processing	
CS 4520	Mobile Application Development	
CS 4550	Web Development	
DS 4200	Information Presentation and Visualization	
IS 2000	Principles of Information Science	

*The concentration in human-centered computing requires a fall co-op pattern.

SOFTWARE CONCENTRATION

Code	Title	Hours
CS 2800	Logic and Computation	4
CS 3700	Networks and Distributed Systems	4

Code	Title	Hours
CS 4400	Programming Languages	4
Complete one of the following classes not already taken:		4
CS 3520	Programming in C++	
CS 3620	Building Extensible Systems	
CS 4240	Large-Scale Parallel Data Processing	
CS 4410	Compilers	
CS 4520	Mobile Application Development	
CS 4550	Web Development	
CS 4820	Computer-Aided Reasoning	
CS 4830	System Specification, Verification, and Synthesis	

SYSTEMS CONCENTRATION

Code	Title	Hours
CS 3700	Networks and Distributed Systems	4
Complete one of the following classes not already taken:		4
CY 3740	Systems Security	
CY 4740	Network Security	
Complete two of the following classes not already taken:		8
CS 3520	Programming in C++	
CS 4300	Computer Graphics	
CY 3740	Systems Security	
CS 4610	Robotic Science and Systems	
CS 4710	Mobile and Wireless Systems	
CY 4740	Network Security	

Supporting Courses

Code	Title	Hours
Mathematics Courses		
MATH 1341	Calculus 1 for Science and Engineering	4
MATH 1365	Introduction to Mathematical Reasoning	4
Science Courses		
Complete one course from one of the following groups:		4-5
Biology		
BIOL 1111 and BIOL 1112	General Biology 1 and Lab for BIOL 1111	
Chemistry		
CHEM 1101 and CHEM 1102 and CHEM 1103	General Chemistry for Health Sciences and Lab for CHEM 1101 and Recitation for CHEM 1101	
CHEM 1151 and CHEM 1153	General Chemistry for Engineers and Recitation for CHEM 1151	
Geology		
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	
Mathematics		
MATH 1342	Calculus 2 for Science and Engineering	
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 1151 and PHYS 1152 and PHYS 1153	Physics for Engineering 1 and Lab for PHYS 1151 and Interactive Learning Seminar for PHYS 1151	

| PHYS 1161 | Physics 1 |
| and PHYS 1162 | and Lab for PHYS 1161 |

Computing and Social Issues

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

Required General Electives

Code	Title	Hours
Complete 28 credits of general electives.		28

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
- 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.

Any missing prerequisites or NUpath requirements must be taken using computer science or general electives.

Students should plan to take a NUpath capstone using designated courses in either a concentration, computer science electives, or as a general elective.

Program Requirement

133 total semester hours required

Plan of Study
Sample Plan of Study
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 and CS 3501	5	MATH 1341	4
CS 1800 and CS 1802	5	CS 2810	4	Elective	4	Elective	4

	Hours		Hours		Hours		Hours
CS 2500 and CS 2501	5	MATH 1365	4				
ENGW 1111	4	Elective	4				
Foreign language course	4						
	19		17		9		8

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1210	1	Co-op		Co-op		Elective	4
CS 3000	4					Elective	4
CS 3650	4						
Concentration course	4						
Foreign language course	4						
	17		0		0		8

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3800	4	Co-op		Co-op		ENGW 3302	4
Foreign language course	4					Elective	4
Concentration course	4						
Science course	4						
	16		0		0		8

Year 4

Fall	Hours	Spring	Hours
Computing and social issues course	4	CS 4500	4
Concentration course	4	Concentration course	4
Security course	4	Presentation requirement	4
Khoury elective	4	Elective	4
	16		16

Total Hours: 134