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.

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 (p. 128).

NUpath Requirements

All undergraduate students are required to complete the NUpath Requirements (p. 111).

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 1180	The Dynamic On-Screen Presenter	
THTR 2345	Acting for the Camera	
Khoury Elective Courses		
Students should plan to take a NUpath capstone using designated courses in either a concentration, computer science electives, or as a general elective.		
With adviser approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.		

Complete 8 semester hours of CS, CY, DS, or IS classes that are not already required. Choose courses within the following ranges:	8
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 college approval. Any missing prerequisites or NUpath requirements must be taken using computer science or general electives. In particular, students must arrange to take a NUpath capstone using either a course in the concentration or a CS, CY, DS, or IS course taken as a computer science elective or as a general elective.

- Artificial Intelligence (p. 698)
- Foundations (p. 698)
- Human-Centered Computing (p. 698)
- Software (p. 699)
- Systems (p. 699)

Supporting Courses

Code	Title	Hours
Mathematics Courses		
MATH 1341	Calculus 1 for Science and Engineering	4
MATH 1365	Introduction to Mathematical Reasoning	4
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	
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	
Electrical Engineering		
EECE 2322 and EECE 2323	Fundamentals of Digital Design and Computer Organization and Lab for EECE 2322	5
Science Requirement		
Complete two courses (and any required labs) from the following science 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 1202 and ENVR 1203	History of Earth and Life and Interpreting Earth History
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
ENVR 5242 and ENVR 5243	Ancient Marine Life and Lab for ENVR 5242
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 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 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
- Demonstrating Thought and Action in a Capstone

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 4610	Robotic Science and Systems	
DS 4420	Machine Learning and Data Mining 2	
IS 4200	Information Retrieval	
PSYC 3466	Cognition	

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	Cryptography	

CONCENTRATION IN HUMAN-CENTERED COMPUTING*

Code	Title	Hours
IS 4300	Human Computer Interaction	4
IS 4800	Empirical Research Methods	4
Complete two of the following 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.

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 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 4610	Robotic Science and Systems	
CS 4700	Network Fundamentals	
CS 4710	Mobile and Wireless Systems	
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 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
CS 2500 and CS 2501	5	Science elective with lab	4				
ENGW 1111	4	Elective	4				
MATH 1365	4						
	19		**17**		**9**		**8**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1210	1	Co-op		Co-op		EECE 2322 and EECE 2323	5
CS 3000	4					Elective	4
CS 3650	4						
Concentration course	4						
Elective	4						
	17		**0**		**0**		**9**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3800	4	Co-op		Co-op		ENGW 3302	4
Computing and social issues	4					Elective	4
Concentration course	4						
Presentation requirement	4						
	16		**0**		**0**		**8**

Year 4

Fall	Hours	Spring	Hours
Concentration course	4	CS 4530	4
Khoury elective	4	Concentration course	4
Security course	4	Khoury elective	4
Elective	4	Science elective with lab	4
	16		**16**

Total Hours: 135

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
CS 1200	1	CS 2510 and CS 2511	5	CS 3000	4	MATH 1341	4
CS 1800 and CS 1802	5	CS 2810	4	Elective	4	Elective	4
CS 2500 and CS 2501	5	Science elective with lab	4				
ENGW 1111	4	Elective	4				
MATH 1365	4						
	19		**17**		**8**		**8**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1210	1	CS 3800	4	EECE 2322 and EECE 2323	5	Co-op	
CS 3500 and CS 3501	5	Concentration course	4	Elective	4		
CS 3650	4	Presentation requirement	4				
Concentration course	4	Computing and social issues	4				
Elective	4						
	18		**16**		**9**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		Concentration course	4	ENGW 3302	4	Co-op	
		Khoury elective	4	Elective	4		
		Security course	4				
		Elective	4				
	0		**16**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours
Co-op		CS 4530	4
		Concentration course	4
		Khoury elective	4

	Science elective with lab	4
	0	**16**

Total Hours: 135