

# Computer Science and Biology, BS

The computer science and biology combined major reflects how research in biology, especially genetics, has become a computational science. The program provides a strong foundation in biology, chemistry, and mathematics, as well as software development and algorithms.

## Program Requirements

- Concentrations and course offerings may vary by campus and/or by program modality. Please consult with your advisor or admissions coach for the course availability each term at your campus or within your program modality.
- Certain options within the program may be *required* at certain campuses or for certain program modalities. Please consult with your advisor or admissions coach for requirements at your campus or for your program modality.

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 Courses

Code	Title	Hours
<b>Computer Science Overview</b>		
CS 1200	First Year Seminar <sup>1</sup>	1
CS 1210	Professional Development for Khoury Co-op <sup>2</sup>	1
<b>Computer Science Fundamental Courses</b>		
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
<b>Computer Science Required Courses</b>		
CS 3000	Algorithms and Data	4
CS 3200	Introduction to Databases	4
CS 3500 and CS 3501	Object-Oriented Design and Lab for CS 3500	5
CS 3800	Theory of Computation (integrative course)	4
CS 4500 or CS 4530	Software Development Fundamentals of Software Engineering	4
<b>Khoury Elective Courses</b>		
With advisor 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		

<sup>1</sup> Students entering through the Department of Biology may take Biology at Northeastern (BIOL 1000).

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<sup>2</sup> Students entering through the Department of Biology may take Professional Development for Co-op (EESC 2000).

## Biology Courses

Code	Title	Hours
<b>Biology Core Courses</b>		
BIOL 1107 and BIOL 1108	Foundations of Biology and Lab for BIOL 1107	5
BIOL 2299	Inquiries in Biological Sciences	4
BIOL 2301 and BIOL 2302	Genetics and Molecular Biology and Lab for BIOL 2301	5
BIOL 2309	Biology Project Lab	4
BIOL 3611 and BIOL 3612	Biochemistry and Lab for BIOL 3611	5
<b>Organismal and Evolutionary Biology Elective</b>		
Complete one of the following:		4-5
BIOL 2327	Human Parasitology	
BIOL 3401	Comparative Vertebrate Anatomy	
BIOL 3413	Current Topics in Organismal and Population Biology	
EEMB 2302 and EEMB 2303	Ecology and Lab for EEMB 2302	
EEMB 2400	Introduction to Evolution	
EEMB 2700 and EEMB 2701	Marine Biology and Lab for EEMB 2700	
EEMB 3460	Conservation Biology	
EEMB 3466	Disease Ecology	
EEMB 3600	Animal Behavior	
<b>Intermediate/Advanced Biology Electives</b>		
Complete one of the following:		4-5
BIOL 2311 to BIOL 4999		
EEMB 2290 to EEMB 5515		
EEMB 5548 to EEMB 5569		
<b>Biology Capstone</b>		
Complete one of the following:		4
BIOL 4701	Biology Capstone	
BIOL 4900	Biology Research Capstone (concurrent with BIOL 4991 or BIOL 4994, which may be used toward intermediate/advanced biology electives)	
BIOL 4971	Junior/Senior Honors Project 2	
<b>Supporting Courses for Computer Science/Biology</b>		
Code	Title	Hours
<b>Chemistry</b>		
CHEM 1161 and CHEM 1162 and CHEM 1163	General Chemistry for Science Majors and Lab for CHEM 1161 and Recitation for CHEM 1161	5
CHEM 2311 and CHEM 2312	Organic Chemistry 1 and Lab for CHEM 2311	5
CHEM 2313 and CHEM 2314	Organic Chemistry 2 and Lab for CHEM 2313	5
<b>Calculus</b>		
MATH 1341	Calculus 1 for Science and Engineering	4
<b>Probability and Statistics</b>		
ENVR 2500 and ENVR 2501	Biostatistics and Lab for ENVR 2500	5
<b>Computing and Social Issues</b>		
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
HIST 2220	History of Technology
INSH 2102	Bostonography: The City through Data, Texts, Maps, and Networks
IS 1300 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	Technology and Society

**Intermediate or Advanced Science**

Complete one course from the following:	4
BIOL 2327 to BIOL 3999	
BIOL 4705 to BIOL 5999	
CHEM 2311 to CHEM 5999	
EEMB 2290 to EEMB 5999	
ENVR 2310 to ENVR 5999	
MATH 2280 to MATH 5999	
PHYS 2303 to PHYS 5999	
PSYC 2290 to PSYC 5999	

**Integrative Courses**

Code	Title	Hours
Complete one of the following:		4-5
BINF 6310	Introduction to Computational Methods in Bioinformatics	
BIOL 4707	Cell and Molecular Biology	
BIOL 5581	Biological Imaging	
BIOL 5587	Comparative Neurobiology	
BIOL 5591	Advanced Genomics	

**Writing Requirements**

Code	Title	Hours
<b>College Writing</b>		
ENGW 1111	First-Year Writing	4
<b>Advanced Writing in the Disciplines</b>		
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 20 semester hours of general electives.		20

**NUpath Requirements Satisfied**

- Engaging with the Natural and Designed World
- Conducting Formal and Quantitative Reasoning
- Exploring Creative Expression and Innovation
- 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.

**Khoury College GPA Requirement**

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

**Program Requirement**

141 total semester hours required

**Plan of Study****Sample Pattern: Four Years, Two Co-ops in Summer 2/Fall**

Year 1									
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours	
BIOL 1107 and BIOL 1108		5 CS 2510 and CS 2511		5 BIOL 2301 and BIOL 2302		5 CS 3000		4	
CS 1200		1 BIOL 2299		4 CS 3500 and CS 3501		5 Elective		4	
CS 1800 and CS 1802		5 CHEM 1161 and CHEM 1162 and CHEM 1163		5					
CS 2500 and CS 2501		5 MATH 1341		4					
ENGW 1111		4							
		<b>20</b>		<b>18</b>		<b>10</b>		<b>8</b>	
Year 2									
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours	
CHEM 2311 and CHEM 2312		5 CS 1210		1 BIOL 3611 and BIOL 3612		5 Co-op		0	
Khoury elective		4 CHEM 2313 and CHEM 2314		5 Elective		4			
Computing and social issues		4 BIOL 2309		4					
Elective		4 Biology elective 1 and lab Elective		5 4					
		<b>17</b>		<b>19</b>		<b>9</b>		<b>0</b>	
Year 3									
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours	
Co-op		0 CS 4500 or 4530		4 ENGW 3302, 3307, or 3315		4 Co-op		0	
		ENVR 2500 and ENVR 2501		5 Elective		4			
		Biology elective 2		4					
		Intermediate/advanced science		4					
		<b>0</b>		<b>17</b>		<b>8</b>		<b>0</b>	
Year 4									
Fall	Hours	Spring	Hours						
Co-op		0 Biology capstone		4					
		CS 3800		4					
		CS 3200		4					
		Biology integrative		4					
		<b>0</b>		<b>16</b>					

Total Hours: 142

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

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
BIOL 1107 and BIOL 1108		5 CS 2510 and CS 2511		5 CS 3500 and CS 3501		5 CS 3000		4

CS 1200	1	BIOL 2299	4	Elective	4	Elective	4
CS 1800 and CS 1802	5	CHEM 1161 and CHEM 1162 and CHEM 1163	5				
CS 2500 and CS 2501	5	MATH 1341	4				
ENGW 1111	4						

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	<b>20</b>		<b>18</b>		<b>9</b>		<b>8</b>
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**Year 2**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1210	1	Co-op	0	Co-op	0	CHEM 2313 and CHEM 2314	5
CHEM 2311 and CHEM 2312	5					Elective	4
BIOL 2301 and BIOL 2302	5						
Computing and social issues	4						
Elective	4						

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	<b>19</b>		<b>0</b>		<b>0</b>		<b>9</b>
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**Year 3**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
BIOL 2309	4	Co-op	0	Co-op	0	ENGW 3302, 3307, or 3315	4
BIOL 3611 and BIOL 3612	5					Elective	4
Khoury elective	4						
Biology elective 1 and lab	5						

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	<b>18</b>		<b>0</b>		<b>0</b>		<b>8</b>
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**Year 4**

Fall	Hours	Spring	Hours
CS 4500 or 4530	4	Biology capstone	4
ENVR 2500 and ENVR 2501	5	CS 3800	4
Intermediate/advanced science	4	CS 3200	4
Biology elective 2	4	Biology integrative	4

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	<b>17</b>		<b>16</b>
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**Total Hours: 142**