Computer Science and Biology, BS (Oakland)

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

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
Computer Science Overview		
CS 1200	First Year Seminar [1]	1
CS 1210	Professional Development for Khoury Co-op [2]	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 3200	Introduction to Databases	4
CS 3800	Theory of Computation (integrative course)	4
CS 4530	Fundamentals of Software Engineering	4
or CS 4535	Professional Practicum Capstone	
Khoury Approved Electives		
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 semester hours from within the following options:		4
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	

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

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

Biology Courses

Code	Title	Hours
Biology Core Courses		
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
Organismal and Evolutionary Biology Elective		
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	
Intermediate/Advanced Biology Electives		
Complete one of the following:		4-5
BIOL 2311 to BIOL 4999		
EEMB 2290 to EEMB 5515		
EEMB 5548 to EEMB 5569		
Biology Capstone		
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	

Supporting Courses for Computer Science/Biology

Code	Title	Hours
Chemistry		
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
Calculus		
MATH 1341	Calculus 1 for Science and Engineering	4
Probability and Statistics		
ENVR 2500 and ENVR 2501	Biostatistics and Lab for ENVR 2500	5
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	
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 Bioinformatics	
BIOL 4707	Cell and Molecular Biology	
BIOL 5581	Biological Imaging	
BIOL 5587	Comparative Neurobiology	
BIOL 5591	Advanced Genomics	

Writing Requirements

Code	Title	Hours
College Writing		
ENGW 1111	First-Year Writing	4
or ENGW 1102	First-Year Writing for Multilingual Writers	
Advanced Writing in the Disciplines		
ENGW 3302	Advanced Writing in the Technical Professions	4
or ENGW 3307	Advanced Writing in the Sciences	
or ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines	

Required General Electives

Code	Title	Hours
Complete 20 semester hours of general electives.		20

NUpath Requirements Satisfied

- Advanced Writing in the Disciplines
- Analyzing and Using Data
- Conducting Formal and Quantitative Reasoning
- Demonstrating Thought and Action in a Capstone
- Engaging with the Natural and Designed World
- Writing in the First Year
- Writing-Intensive in the Major

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 Plans of Study

FOUR YEARS, TWO CO-OPS IN SUMMER SECOND HALF/FALL

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
BIOL 1107 and BIOL 1108	5	BIOL 2299	4	BIOL 2301 and BIOL 2302	5	CS 3000	4
CS 1200	1	CHEM 1161 and CHEM 1162 and CHEM 1163	5	CS 3100 and CS 3101	5	General Elective	4
CS 1800 and CS 1802	5	CS 2100 and CS 2101	5				
CS 2000 and CS 2001	5	MATH 1341	4				
ENGW 1111	4						
	20		**18**		**10**		**8**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	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	General Elective	4		
Computing and social issues	4	BIOL 2309	4				
General Elective	4	Biology elective 1 and lab	5				
		General Elective	4				
	17		**19**		**9**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	CS 4530 or 4535	4	ENGW 3302, 3307, or 3315	4	Co-op	0
		ENVR 2500 and ENVR 2501	5	General Elective	4		
		Biology elective 2	4				
		Intermediate/advanced science	4				
	0		**17**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours
Co-op	0	Biology capstone	4
		CS 3800	4
		CS 3200	4
		Biology integrative	4
	0		**16**

Total Hours: 142

FOUR YEARS, TWO CO-OPS IN SPRING/SUMMER FIRST HALF

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
BIOL 1107 and BIOL 1108	5	BIOL 2299	4	CS 3100 and CS 3101	5	CS 3000	4

CS 1200	1	CHEM 1161 and CHEM 1162 and CHEM 1163	5	General Elective	4	General Elective	4
CS 1800 and CS 1802	5	CS 2100 and CS 2101	5				
CS 2000 and CS 2001	5	MATH 1341	4				
ENGW 1111	4						
	20		**18**		**9**		**8**

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					General Elective	4
BIOL 2301 and BIOL 2302	5						
Computing and social issues	4						
General Elective	4						
	19		**0**		**0**		**9**

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					General Elective	4
Khoury Elective	4						
Biology elective 1 and lab	5						
	18		**0**		**0**		**8**

Year 4

Fall	Hours	Spring	Hours
CS 4530 or 4535	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
	17		**16**

Total Hours: 142