Data Science and Biology, BS (Boston)

The data science and biology major provides a strong foundation in biology, chemistry, and mathematics, as well as software development and algorithms. Students study the collection, manipulation, storage, retrieval, and computational analysis of data in its various forms, including numeric, textual, image, and video data from small to large volumes. Students also explore the organization and processes of life across broad areas of the field, from molecules and cells through organs and organ systems to populations, ecosystems, and evolution.

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/).

Data Science Requirements

Code	Title	Hours
Computer Science Overview		
Must be taken in alignment with your home college:		
CS 1200	First Year Seminar	1
or BIOL 1000	Biology at Northeastern	
or INSC 1000	Science at Northeastern	
CS 1210	Professional Development for Khoury Co-op	1
or EESC 2000	Professional Development for Co-op	
Computer Science Required 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 with 4-5 semester hours 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 3200	Introduction to Databases	4
Programming Sequence Pathways		
Choose one of the two options:		9
Computer Science Option		
CS 2100 and CS 2101	Program Design and Implementation 1 and Lab for CS 2100	
CS 3100 and CS 3101	Program Design and Implementation 2 and Lab for CS 3100	
Data Science Option		
DS 2500 and DS 2501	Intermediate Programming with Data and Lab for DS 2500	
DS 3500	Advanced Programming with Data	
Data Science Foundations		
DS 3000	Foundations of Data Science	4
DS 4200	Information Presentation and Visualization	4
DS 4300	Large-Scale Information Storage and Retrieval	4
DS 4400	Machine Learning and Data Mining 1	4
Khoury Approved Electives		
With advisor approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.		

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	
Statistics Foundations		
ENVR 2500 and ENVR 2501	Biostatistics and Lab for ENVR 2500	5

Computer Science 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 3315	Interdisciplinary Advanced Writing in the Disciplines	
or ENGW 3307	Advanced Writing in the Sciences	

Biology Requirements

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
Intermediate and Advanced Biology Elective		
Complete one of the following:		4
BIOL 2327 to BIOL 3999		
BIOL 4705 to BIOL 5999		
EEMB 2290 to EEMB 5515		
EEMB 5520 to EEMB5534		
EEMB 5548 to EEMB 5569		
Research		
BIOL 4991	Research	
BIOL 4970	Junior/Senior Honors Project 1	
BIOL 4971	Junior/Senior Honors Project 2	
BIOL 4994	Internship	
Organismal and Evolutionary Biology Elective		
Complete one course and its corresponding lab, if indicated:		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	

Supporting Courses for Biology		
Chemistry		
CHEM 1161 and CHEM 1162	General Chemistry for Science Majors and Lab 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
Physics		
PHYS 1145 and PHYS 1146	Physics for Life Sciences 1 and Lab for PHYS 1145 (Preferred)	5
or PHYS 1151	Physics for Engineering 1	
or PHYS 1161	Physics 1	
Math		
MATH 1341	Calculus 1 for Science and Engineering	4

Integrative Requirements

Code	Title	Hours
Integrative Course		
Complete one of the following:		4
BINF 6310	Introduction to Bioinformatics	
BIOL 4707	Cell and Molecular Biology	
BIOL 5581	Biological Imaging	
BIOL 5587	Comparative Neurobiology	
BIOL 5591	Advanced Genomics	
Capstone		
Choose one:		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	

Required General Electives

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

Khoury College GPA Requirement

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

Science GPA Requirement (Biology)

A minimum 2.000 GPA in the following course codes is required: BIOC, BIOL, BNSC, CHEM, EEMB, ENVR, MATH, PHYS, PSYC.

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
- Exploring Creative Expression and Innovation
- Writing in the First Year
- Writing-Intensive in the Major

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

Program Requirement

138 total semester hours required

Plan of Study

Sample Plan of Study

FOUR YEARS, TWO CO-OPS , 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	General Elective	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	DS 2500 and DS 2501	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
BIOL 2309	4	CHEM 2313 and CHEM 2314	5	BIOL 3611 and BIOL 3612	5	Co-op	0
CHEM 2311 and CHEM 2312	5	CS 1210	1	General Elective	4		
DS 3000	4	CS 3200	4				
PHYS 1145 and PHYS 1146	5	DS 3500	4				
		DS 4200	4				
	18		**18**		**9**		**0**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	DS 4300	4	ENGW 3302, 3307, or 3315	4	Co-op	0
		DS 4400	4	Khoury Elective	4		
		ENVR 2500 and ENVR 2501	5				
		General Elective	4				
	0		**17**		**8**		**0**

Year 4

Fall	Hours	Spring	Hours
Co-op	0	BIOL 4701, 4900, or 4971	4
		BIOL Intermediate/ Advanced Science	4
		Integrative course	4
		Organismal and Population BIOL Elective	4
	0		**16**

Total Hours: 141

FOUR YEARS, TWO CO-OPS, 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	BIOL 2301 and BIOL 2302	5	General Elective	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	DS 2500 and DS 2501	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
BIOL 2309	4					General Elective	4
CHEM 2311 and CHEM 2312	5						
DS 3000	4						
PHYS 1145 and PHYS 1146	5						
	19		**0**		**0**		**9**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3200	4	Co-op	0	Co-op	0	ENGW 3302, 3307, or 3315	4
DS 3500	4					General Elective	4
DS 4200	4						
BIOL 3611 and BIOL 3612	5						
	17		**0**		**0**		**8**

Year 4

Fall	Hours	Spring	Hours
DS 4300	4	BIOL 4701, 4900, or 4971	4
DS 4400	4	BIOL Intermediate/ Advanced Science	4
ENVR 2500 and ENVR 2501	5	Integrative course	4
Khoury Elective	4	Organismal and Population BIOL Elective	4
	17		**16**

Total Hours: 141