

Data Science and Biochemistry, BS

The Data Science and Biochemistry Major combines computer science, biochemistry, biology, information science, mathematics, and statistics into an integrated curriculum. The program engages students in rigorous coursework designed to prepare students to interpret the ever-expanding knowledge base.

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/>).

Data Science Requirements

Code	Title	Hours
Computer Science Overview		
Must be taken in alignment with your home college:		
CS 1200 or BIOC 1000 or INSC 1000	First Year Seminar Biochemistry at Northeastern Science at Northeastern	1
CS 1210 or EESC 2000	Professional Development for Khoury Co-op Professional Development for Co-op	1
Programming Sequence Pathways		
Choose one of the two options:		12
<i>Computer Science Option</i>		
CS 2500 and CS 2501	Fundamentals of Computer Science 1 and Lab for CS 2500	
CS 2510 and CS 2511	Fundamentals of Computer Science 2 and Lab for CS 2510	
CS 3500 and CS 3501	Object-Oriented Design and Lab for CS 3500	
<i>Data Science Option</i>		
DS 2000 and DS 2001	Programming with Data and Data Science Programming Practicum	
DS 2500 and DS 2501	Intermediate Programming with Data and Lab for DS 2500	
DS 3500	Advanced Programming with Data	
Computer Science Required Courses		
CS 1800 and CS 1802	Discrete Structures and Seminar for CS 1800	5
CS 3200	Introduction to Databases	4
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 Elective

With adviser approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.

Complete four semester hours 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

Statistics Foundations

Complete one of the following: 4-5

ENVR 2500 and ENVR 2501
Biostatistics and Lab for ENVR 2500

MATH 3081
Probability and Statistics

Computer Science Writing Requirement

Code	Title	Hours
------	-------	-------

College Writing

ENGW 1111 or ENGW 1102	First-Year Writing First-Year Writing for Multilingual Writers	4
---------------------------	---	---

Advanced Writing in the Disciplines

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
---	--	---

Biochemistry Requirements

Code	Title	Hours
------	-------	-------

Biology Foundations

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
-----------	---------------------	---

Chemistry Foundations

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
----------------------------	--	---

Mathematics Foundations

MATH 1341	Calculus 1 for Science and Engineering	4
-----------	--	---

MATH 1342	Calculus 2 for Science and Engineering	4
-----------	--	---

Biochemistry Foundations

BIOL 3611 and BIOL 3612	Biochemistry and Lab for BIOL 3611	5
----------------------------	---------------------------------------	---

CHEM 3331 and CHEM 3332 or CHEM 5620	Bioanalytical Chemistry and Lab for CHEM 3331 Protein Chemistry	3-5
--	---	-----

Intermediate or Advanced Science Elective

Complete one course from the following: 3-5

BIOL 2301 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

Integrative Requirement

Code	Title	Hours
Integrative Courses		
BINF 6310	Introduction to Computational Methods in Bioinformatics	4
Complete one of the following:		4
BIOL 4701	Biology Capstone	
CHEM 4750	Senior Research	

Required General Electives

Code	Title	Hours
Complete 16 semester hours of general electives.		16

Major GPA Requirement

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

NUpath Requirements Satisfied

- Engaging with the Natural and Designed World
- Exploring Creative Expression and Innovation
- 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

131 total semester hours required

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

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
BIOL 1107 and BIOL 1108		5 BIOL 2299		4 BIOL 2301 and BIOL 2302		5 MATH 1342		4
CS 1200, BIOC 1000, or INSC 1000		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				
DS 2000 and DS 2001		4 MATH 1341		4				
ENGW 1111		4						
		19			18			9
								8
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CHEM 2311 and CHEM 2312		5 CHEM 2313 and CHEM 2314		5 BIOL 2309		4 Co-op		0
CS 3200		4 CS 1210 or EESC 2000		1 Khoury Elective		4		

4 Data Science and Biochemistry, BS

DS 3000	4	DS 3500	4
Statistics Foundation	4	DS 4200	4
		General Elective	4
	17		18
			8
			0

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	BINF 6310	4	ENGW 3302, 3307, or 3315	4	Co-op	0
		BIOL 3611 and BIOL 3612	5				
		DS 4300	4				
		Intermediate/Advanced Science Elective	4				
	0		17		4		0

Year 4

Fall	Hours	Spring	Hours
Co-op	0	CHEM 5620 or 3331 <i>and</i> 3332	3-5
		General Elective	4
		DS 4400	4
		Capstone	4
	0		15-17

Total Hours: 133-135

Four Years, Two Co-ops Spring/Summer 1

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	MATH 1342	4
CS 1200, BIOC 1000, or INSC 1000	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				
DS 2000 and DS 2001	4	MATH 1341	4				
ENGW 1111	4						
	19		18		9		8

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1210	1	Co-op	0	Co-op	0	BIOL 3611 and BIOL 3612	5
CHEM 2311 and CHEM 2312	5					General Elective	4
CS 3200	4						
DS 3000	4						
Statistics Foundation	4						
	18		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	4
DS 3500	4						
CHEM 2313 and CHEM 2314	5						

DS 4200	4				
	17		0		4
Year 4					
Fall	Hours	Spring		Hours	
BINF 6310	4	CHEM 5620 or 3331 <i>and</i> 3332		3-5	
DS 4300	4	DS 4400		4	
Intermediate/Advanced Science Elective	4	Capstone		4	
Khoury Elective	4	General Elective		4	
	16			15-17	

Total Hours: 133-135