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

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.

University-Wide Requirements

All undergraduate students are required to complete the University-Wide Requirements (http://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/).

NUpath Requirements

All undergraduate students are required to complete the NUpath Requirements (http://catalog.northeastern.edu/undergraduate/university-academics/nupath/).

Data Science Requirements

Code	Title	Hours
Computer Science Overview		
CS 1200	First Year Seminar	1
CS 1210	Professional Development for Khoury Co-op	1
Programming Sequence Pathways		
Choose one of the two options.		12
Computer Science Option		
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	
Data Science Option		
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	Database Design	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 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		
DS 2500 or higher, except DS 4900		
CY 2000 or higher, except CY 4930		
IS 2000 or higher, except IS 4900		
Statistics Foundations		
Complete one of the following:		4
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	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	

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	Bioanalytical Chemistry and Lab for CHEM 3331	3-5
or CHEM 4620	Introduction to Protein Chemistry	

or CHEM 5620	Protein Chemistry
Intermediate or Advanced Science Elective	
Complete one course from the following	4-5
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 6308	Bioinformatics Computational Methods 1	4
BINF 6309	Bioinformatics Computational Methods 2	4
Complete one of the following:		4
BIOL 4701	Biology Capstone	
CHEM 4750	Senior Research	

Required General Electives

Code	Title	Hours
Complete 12 credits of general electives.		12

Major GPA Requirement

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

Program Requirement

131 total semester hours required

Plan of Study

Sample Patterns:

Five Years, Three Co-ops

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1200	1	CS 2510 and CS 2511	5	Vacation		Vacation	
CS 1800 and CS 1802	5	BIOL 2299	4				
CS 2500 and CS 2501	5	MATH 1341	4				
BIOL 1107 and BIOL 1108	5	CHEM 1161 and CHEM 1162	5				
ENGW 1111	4						
	20		18		0		0

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3500 and CS 3501	5	BIOL 2301 and BIOL 2302	5	CS 3200	4	Co-op	
DS 3000	4	DS 4200	4	BIOL 2309	4		
MATH 1342	4	CHEM 2311 and CHEM 2312	5				
Intermediate/ Advanced Science Elective	4	CS 1210	1				
		Statistics Foundation	4				
	17		19		8		0

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		DS 4300	4	ENGW 3302	4	Co-op	
		CHEM 2313 and CHEM 2314	5	BIOL 3611 and BIOL 3612	5		
		Khoury Elective	4				
		General Elective	4				
	0		17		9		0

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		DS 4400	4	Vacation		Co-op	
		BINF 6308	4				
		CHEM 3331 or 4620	4				
		General Elective	4				
	0		16		0		0

Year 5

Fall	Hours	Spring	Hours
Co-op		Capstone	4
		BINF 6309	4
		General Elective	4
	0		12

Total Hours: 136

Four Years, Two Co-ops

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	Vacation	
CS 1800 and CS 1802	5	BIOL 2299	4	MATH 1342	4		
CS 2500 and CS 2501	5	MATH 1341	4				
BIOL 1107 and BIOL 1108	5	CHEM 1161 and CHEM 1162	5				
ENGW 1111	4						
	20		18		9		0

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
DS 3000	4	BIOL 2301 and BIOL 2302	5	CS 3200	4	Co-op	

Intermediate/ Advanced Science Elective	4	DS 4200	4	BIOL 2309	4
Statistics Foundation	4	DS 4300	4		
General Elective	4	CHEM 2311 and CHEM 2312	5		
		CS 1210	1		
	16		19		8

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		DS 4400	4	ENGW 3302	4	Co-op	
		CHEM 2313 and CHEM 2314	5	BIOL 3611 and BIOL 3612	5		
		BINF 6308	4				
		Khoury Elective	4				
	0		17		9		0

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours
Co-op		BINF 6309	4	General Elective	4
		CHEM 3331 or 4620	4		
		Capstone	4		
		General Elective	4		
	0		16		4

Total Hours: 136