

Data Science and Chemistry, BS

The data science and chemistry major combines chemistry, information science, and mathematics to give students both breadth and depth in chemistry and data science fundamentals. During their course of study, students have an opportunity to develop qualitative and quantitative problem-solving skills as well as effective communication skills. Students will study the collection, manipulation, storage, retrieval, and computational analysis of chemical and other scientific data in its various forms, including numeric, textual, image, and video data from small to large volumes. 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 CHEM 1000 or INSC 1000	First Year Seminar Chemistry/Chemical Biology 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 advisor approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.

Complete 4 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

ENVR 2500 and ENVR 2501	Biostatistics and Lab for ENVR 2500	5
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Chemistry Requirements

Code	Title	Hours
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General 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 2161 and CHEM 2162 and CHEM 2163	Concepts in Chemistry and Lab for CHEM 2161 and Recitation for CHEM 2161	5

Organic Chemistry

Complete one of the following: 5

CHEM 2311
and CHEM 2312

Organic Chemistry 1
and Lab for CHEM 2311

CHEM 2315
and CHEM 2316

Organic Chemistry 1 for Chemistry Majors
and Lab for CHEM 2315

Complete one of the following: 5

CHEM 2313
and CHEM 2314

Organic Chemistry 2
and Lab for CHEM 2313

CHEM 2317
and CHEM 2318

Organic Chemistry 2 for Chemistry Majors
and Lab for CHEM 2317

Analytical Chemistry

CHEM 2321 and CHEM 2322 and CHEM 2323	Analytical Chemistry and Lab for CHEM 2321 and Recitation for CHEM 2321	5
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Advanced-Level Chemistry

Complete one course from the following options: 4

CHEM 3410

Environmental Geochemistry

CHEM 3501 to CHEM 4628

Mathematics Foundations

MATH 1341	Calculus 1 for Science and Engineering	4
MATH 1342	Calculus 2 for Science and Engineering	4

Supporting Course

PHYS 1151 and PHYS 1152 and PHYS 1153	Physics for Engineering 1 and Lab for PHYS 1151 and Interactive Learning Seminar for PHYS 1151	5
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Integrative Requirements

Code	Title	Hours
Integrative Courses		
CHEM 3401 and CHEM 3402	Chemical Thermodynamics and Kinetics and Lab for CHEM 3401	5
CHEM 4750	Senior Research	4

Writing Requirements

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		
Complete one of the following:		4
ENGW 3302	Advanced Writing in the Technical Professions	
ENGW 3307	Advanced Writing in the Sciences	
ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines	

Required General Electives

Code	Title	Hours
Complete 24 semester hours of general electives.		24

Khoury College 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
- 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

130 total semester hours required

Plan of Study**Sample Plan of Study:****Four Years, Two Co-ops**

Year 1									
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours		
CHEM 1161 and CHEM 1162 and CHEM 1163		5 CHEM 2161 and CHEM 2162 and CHEM 2163		5 General elective		4 Vacation			
CS 1200, CHEM 1000, or INSC 1000		1 DS 2500 and DS 2501		5 General elective		4			
CS 1800 and CS 1802		5 MATH 1341		4					
DS 2000 and DS 2001		4 General elective		4					
ENGW 1111		4							
		19			18			8	0

4 Data Science and Chemistry, BS

Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 2311 and CHEM 2312		5 CHEM 2313 and CHEM 2314		5 General elective		4 Co-op	
CS 3200		4 CS 1210 or EESC 2000		1 General elective		4	
DS 3000		4 DS 3500		4			
MATH 1342		4 DS 4200		4			
		ENVR 2500 and ENVR 2501		5			
		17			19		
						8	0
Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		CHEM 2321 and CHEM 2322 and CHEM 2323		5 ENGW 3302, 3307, or 3315		4 Co-op	
		DS 4300		4 Khoury Elective		4	
		DS 4400		4			
		PHYS 1151 and PHYS 1152 and PHYS 1153		5			
		0			18		
						8	0
Year 4							
Fall	Hours	Spring	Hours				
Co-op		CHEM 4750	4				
		CHEM 3401 and CHEM 3402	5				
		Advanced Level Chemistry	4				
		General elective	4				
		0			17		

Total Hours: 132