Data Science and Chemistry, BS (Boston)

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

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 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 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

Chemistry Requirements

Code	Title	Hours
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	Concepts in Chemistry and Lab 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	Analytical Chemistry and Lab for CHEM 2321	5
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

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

Science GPA Requirement (Chemistry)

A minimum 2.000 GPA in the following course codes is required: CHEM, MATH, PHYS.

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.

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	DS 2500 and DS 2501	5	General Elective	4	Vacation	
CS 1200	1	MATH 1341	4	General Elective	4		
CS 1800 and CS 1802	5	General elective	4				
CS 2000 and CS 2001	5	CHEM 2161 and CHEM 2162	5				
ENGW 1111	4						
	20		**18**		**8**		**0**

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	0
CS 3200	4	CS 1210	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	0	CHEM 2321 and CHEM 2322	5	ENGW 3302, 3307, or 3315	4	Co-op	0
		DS 4300	4	General 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	0	CHEM 4750	4
		CHEM 3401 and CHEM 3402	5
		Advanced Level Chemistry	4
		Khoury Elective	4
	0		**17**

Total Hours: 133