

Data Science and Mathematics, BS

The data science and mathematics combined major combines computer science, data science, and mathematics into an integrated curriculum. The program provides the rigorous theoretical background necessary for success in the data science field.

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 Courses

Code	Title	Hours
Computer Science Overview		
Must be taken in alignment with your home college:		
CS 1200 or MATH 1000 or INSC 1000	First Year Seminar Mathematics 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		
Complete one of 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	Object-Oriented Design	
<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

Khoury Elective Courses

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

Complete 8 semester hours of CS,CY, DS, or IS classes that are not already required. Choose courses within the following ranges: 8

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

Mathematics Courses

Code	Title	Hours
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Problem-Solving Requirement

MATH 1365	Introduction to Mathematical Reasoning	4
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Calculus Requirements

MATH 1341	Calculus 1 for Science and Engineering	4
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MATH 1342	Calculus 2 for Science and Engineering	4
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MATH 2321	Calculus 3 for Science and Engineering	4
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Intermediate and Advanced Math Requirements

MATH 2331	Linear Algebra	4
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MATH 2341	Differential Equations and Linear Algebra for Engineering	4
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MATH 3081	Probability and Statistics	4
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MATH 3175	Group Theory	4
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MATH 3527	Number Theory 1	4
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Mathematics Elective Requirements

Complete four courses in the following range: 16

MATH 3001 to MATH 4999 but not MATH 4000

Integrative Requirements

Code	Title	Hours
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Integrative Courses

DS 4400	Machine Learning and Data Mining 1	4
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DS 4420	Machine Learning and Data Mining 2	4
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Computer Science Writing Requirements

Code	Title	Hours
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College Writing

ENGW 1111	First-Year Writing	4
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Advanced Writing in the Disciplines

ENGW 3302	Advanced Writing in the Technical Professions	4
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or ENGW 3307
Advanced Writing in the Sciences

or ENGW 3315
Interdisciplinary Advanced Writing in the Disciplines

Required General Electives

Code	Title	Hours
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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

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 in Summer 2/Fall

Year 1							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1200		1 DS 2500 and DS 2501		5 MATH 3081		4 Elective	4
CS 1800 and CS 1802		5 MATH 1342		4 Elective		4 Elective	4
DS 2000 and DS 2001		4 MATH 1365		4			
ENGW 1111		4 Elective		4			
MATH 1341		4					
		18		17		8	8
Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3200		4 CS 1210		1 MATH 3527		4 Co-op	0
DS 3000		4 DS 3500		4 Khoury elective		4	
MATH 2321		4 DS 4200		4			
MATH 2341		4 MATH 2331		4			
		MATH elective		4			
		16		17		8	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 Elective		4	
		MATH 3175		4			
		MATH elective		4			
		0		16		8	0
Year 4							
Fall	Hours	Spring	Hours				
Co-op		0 DS 4420		4			
		Khoury elective		4			
		MATH elective		4			
		Elective		4			
		0		16			

Total Hours: 132

Four Years, Two Co-ops in Spring/Summer 1

Year 1							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1200		1 DS 2500 and DS 2501		5 MATH 3081		4 Elective	4
CS 1800 and CS 1802		5 MATH 1342		4 Elective		4 Elective	4
DS 2000 and DS 2001		4 MATH 1365		4			

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ENGW 1111	4	Elective	4					
MATH 1341	4							
	18		17			8		8
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	
CS 1210	1	Co-op		Co-op		Khoury elective		4
CS 3200	4					Elective		4
DS 3000	4							
MATH 2321	4							
MATH 2341	4							
	17		0			0		8
Year 3								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	
Co-op	0	Co-op		Co-op		ENGW 3302, 3307, or 3315		4
DS 3500	4					Elective		4
DS 4200	4							
MATH 2331	4							
MATH Elective	4							
	16		0			0		8
Year 4								
Fall	Hours	Spring	Hours					
DS 4300	4	DS 4420	4					
DS 4400	4	MATH 3527	4					
MATH 3175	4	Khoury elective	4					
MATH elective	4	MATH elective	4					
	16		16					

Total Hours: 132