

# Data Science, BS

The Bachelor of Science in Data Science studies the collection, manipulation, storage, retrieval, and computational analysis of data in its various forms, including numeric, textual, image, and video data from small to large volumes.

## 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 (<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 Major Requirements

Code	Title	Hours
<b>Computer Science Overview</b>		
CS 1200	First Year Seminar	1
CS 1210	Professional Development for Khoury Co-op	1
<b>Fundamental Courses</b>		
CS 1800 and CS 1802	Discrete Structures and Seminar for CS 1800	5
<b>Programming Sequence Pathways</b>		
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	
<b>Computer Science Required Courses</b>		
CS 3000	Algorithms and Data	4
CS 3200	Database Design	4
CS 3520	Programming in C++	4
<b>Data Science Electives</b>		
Complete three of the following:		12
CS 4100	Artificial Intelligence	
CS 4120	Natural Language Processing	

IS 4200	Information Retrieval	
IS 4300	Human Computer Interaction	
<b>Data Science Required Courses</b>		
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
DS 4420	Machine Learning and Data Mining 2	4
DS 4440	Practical Neural Networks	4
<b>Presentation Requirement</b>		
Choose one:		4
COMM 1112	Public Speaking	
COMM 1113	Business and Professional Speaking	
COMM 1210	Persuasion and Rhetoric	
COMM 1511	Communication and Storytelling	
THTR 1125	Improvisation	
THTR 1130	Introduction to Acting	
THTR 1180	The Dynamic On-Screen Presenter	
THTR 2345	Acting for the Camera	
<b>Mathematics Foundations</b>		
MATH 1341	Calculus 1 for Science and Engineering	4
MATH 1342	Calculus 2 for Science and Engineering	4
MATH 2331	Linear Algebra	4
MATH 3081	Probability and Statistics	4
<b>Data Science and Ethics</b>		
PHIL 1145	Technology and Human Values	4
<b>Khoury Elective Courses</b>		
With advisor approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.		
Complete 4 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		
CY 2000 or higher, except CY 4930		
DS 2500 or higher, except DS 4900		
IS 2000 or higher, except IS 4900		
<b>Data Science Related Electives in Other Units</b>		
Complete one of the following:		4
ARTG 3451	Information Design 1	
ARTG 5100	Information Design Studio 1: Principles	
ARTG 5110	Information Design History	
ARTG 5120	Research Methods for Design	
ARTG 5330	Visualization Technologies 1: Fundamentals	
ARTG 6100	Information Design Studio 2: Dynamic Mapping and Models	
ARTG 6200	Information Design Studio 3: Synthesis	
BINF 6308	Bioinformatics Computational Methods 1	

BINF 6309	Bioinformatics Computational Methods 2
ECON 2350	Statistics
ECON 2560	Applied Econometrics
EECE 5639	Computer Vision
EECE 5642	Data Visualization
EECE 5644	Introduction to Machine Learning and Pattern Recognition
ENVR 2500	Biostatistics
FINA 4608	Advanced Financial Strategy
GSND 5110	Game Design and Analysis
GSND 6350	Data-Driven Player Modeling
HINF 5101	Introduction to Health Informatics and Health Information Systems
HINF 5102	Data Management in Healthcare
HINF 5300	Personal Health Interface Design and Development
HINF 5301	Evaluating Health Technologies
IS 4800	Empirical Research Methods
IE 5640	Data Mining for Engineering Applications
MATH 2321	Calculus 3 for Science and Engineering
MATH 4581	Statistics and Stochastic Processes
MGSC 2301	Business Statistics
MISM 3403	Data Management in the Enterprise
MKTG 3401	Marketing Research
MKTG 3501	Marketing Analytics
PHIL 5005	Information Ethics
PHIL 5010	AI Ethics
PSYC 2320	Statistics in Psychological Research
PSYC 3466	Cognition

### Computer Science Writing Requirement

Code	Title	Hours
<b>College Writing</b>		
ENGW 1111	First-Year Writing	4
<b>Advanced Writing in the Disciplines</b>		
ENGW 3302	Advanced Writing in the Technical Professions	4
or ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines	

### Required General Electives

Code	Title	Hours
Complete 24 credits of general electives.		24

### Khoury College GPA Requirement

Minimum 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		
CS 1200	1	DS 2500 and DS 2501	5	CS 3200	4		
CS 1800 and CS 1802	5	MATH 1342	4	MATH 3081	4		
DS 2000 and DS 2001	4	PHIL 1145	4				
ENGW 1111	4	Elective	4				
MATH 1341	4						
		18		8			
Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 3520	4	CS 1210	1	CS 3000	4	Co-op	
DS 3000	4	DS 4200	4	ENGW 3302	4		
DS 3500	4	DS 4300	4				
MATH 2331	4	IS 4300	4				
		Elective	4				
		16		8		0	
Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		CS 4100	4	Co-op		Co-op	
		DS 4400	4				
		Presentation Requirement	4				
		Elective	4				
		0		16		0	
Year 4							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 4120	4	DS 4420	4				
IS 4200	4	DS 4440	4				
Khoury Elective	4	Data Science Related Elective	4				
Elective	4	Elective	4				
		16		16			

Total Hours: 132