

# Data Science, MS (Boston)

Khoury College of Computer Sciences and the College of Engineering jointly offer an interdisciplinary Master of Science in Data Science. This program is designed to give students a comprehensive framework for reasoning about data. Students engage in extensive coursework intended to develop depth in data collection, storage, retrieval, manipulation, visualization, modeling, and interpretation. Students are also able to choose elective courses from a variety of offerings in Khoury, the College of Engineering, and throughout the campus to explore areas that generate data or specialized data science applications. Successful program graduates are well positioned to attain data scientist and data engineer positions in a fast-growing field or to progress into doctoral degrees in related disciplines.

During the admissions process, applicants take a pretest to determine if the Master of Science in Data Science or Master of Science in Data Science—Align fits better with their current skill level. In addition, prospective applicants work with recruitment and enrollment coaching teams to select the appropriate program before applying.

In this degree program, students will be admitted to the college associated with their concentration, and their degree is awarded by that college. The concentrations are associated with the colleges as follows:

- Computer Science—Khoury College of Computer Sciences
- Engineering Theory and Modeling—College of Engineering

Students will follow all policies associated with their home college.

## Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Students should refer to the course numbering table for graduate course leveling (<https://catalog.northeastern.edu/graduate/academic-policies-procedures/course-numbering/>).

## Data Science Core

A cumulative GPA of 3.000 or higher is required in the following core courses.

Code	Title	Hours
<b>Programming with Data</b>		
DS 5110	Essentials of Data Science	4
<b>Algorithms</b>		
CS 5800 or EECE 7205	Algorithms Fundamentals of Computer Engineering	4
<b>Machine Learning</b>		
CS 6140 or EECE 5644	Machine Learning Introduction to Machine Learning and Pattern Recognition	4
<b>Interdisciplinary Capstone</b>		
DS 5500	Data Science Capstone	4

## Data Science Concentration Options

Complete one of the following concentrations:

- Computer Science (p. 1)—Khoury College of Computer Sciences
- Engineering Theory and Modeling (p. )—College of Engineering

## Program Credit/GPA Requirements

32 total semester hours required

Minimum 3.000 GPA required

### COMPUTER SCIENCE CONCENTRATION—KHOURY COLLEGE OF COMPUTER SCIENCES

Code	Title	Hours
Complete 16 semester hours from the following: <sup>1</sup>		16
CS 5100	Foundations of Artificial Intelligence	
CS 5180	Reinforcement Learning and Sequential Decision Making	
CS 5200	Database Management Systems	

CS 5330	Pattern Recognition and Computer Vision
CS 5340	Computer/Human Interaction
CS 5610	Web Development
CS 6120	Natural Language Processing
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
CS 6240	Large-Scale Parallel Data Processing
CS 6350	Empirical Research Methods
CS 6620	Fundamentals of Cloud Computing
CS 6650	Building Scalable Distributed Systems
CS 7140	Advanced Machine Learning
CS 7150	Deep Learning
CS 7180	Special Topics in Artificial Intelligence
CS 7200	Statistical Methods for Computer Science
CS 7250	Information Visualization: Theory and Applications
CS 7280	Special Topics in Database Management
CS 7290	Special Topics in Data Science
CS 7990	Thesis
CS 8674	Master's Project
DS 7995	Project

**ENGINEERING THEORY AND MODELING CONCENTRATION—COLLEGE OF ENGINEERING**

Code	Title	Hours
<b>Foundational Courses</b>		
Complete 4 semester hours from the following: <sup>1</sup>		4
DS 7995	Project	
EECE 5360	Combinatorial Optimization	
EECE 5612	Statistical Inference: An Introduction for Engineers and Data Analysts	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7323	Numerical Optimization Methods	
EECE 7337	Information Theory	
EECE 7346	Probabilistic System Modeling and Analysis	
IE 6400	Foundations for Data Analytics Engineering	
IE 7275	Data Mining in Engineering	
IE 7280	Statistical Methods in Engineering	
<b>Translational and Advanced Courses</b>		
Complete the remaining 12 semester hours from the following:		12
BIOE 5750	Modeling and Inference in Bioengineering	
BIOE 5880	Computational Methods in Systems Bioengineering	
BIOE 6200	Mathematical Methods in Bioengineering	
CHME 5137	Computational Modeling in Chemical Engineering	
CHME 5649	Numerical Strategies and Data Analytics for Chemical Sciences	
CIVE 7100	Time Series and Geospatial Data Sciences	
CIVE 7150	Data-Driven Decision Support for Civil and Environmental Engineering	
EECE 5360	Combinatorial Optimization	
EECE 5612	Statistical Inference: An Introduction for Engineers and Data Analysts	
EECE 5614	Reinforcement Learning and Decision Making Under Uncertainty	
EECE 5626	Image Processing and Pattern Recognition	
EECE 5639	Computer Vision	
EECE 5640	High-Performance Computing	
EECE 5642	Data Visualization	
EECE 5645	Parallel Processing for Data Analytics	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7215	Introduction to Distributed Intelligence	

EECE 7223	Riemannian Optimization
EECE 7323	Numerical Optimization Methods
EECE 7337	Information Theory
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization
EECE 7346	Probabilistic System Modeling and Analysis
EECE 7370	Advanced Computer Vision
EECE 7397	Advanced Machine Learning
EECE 7945	Master's Project
IE 5137	Computational Modeling in Industrial Engineering
IE 5390	Structured Data Analytics for Industrial Engineering
IE 5630	Biosensor and Human Behavior Measurement
IE 5640	Data Mining for Engineering Applications
IE 6400	Foundations for Data Analytics Engineering
IE 6600	Computation and Visualization for Analytics
IE 6700	Data Management for Analytics
IE 6750	Data Warehousing and Integration
IE 7270	Intelligent Manufacturing
IE 7275	Data Mining in Engineering
IE 7280	Statistical Methods in Engineering
IE 7295	Applied Reinforcement Learning in Engineering
IE 7300	Statistical Learning for Engineering
IE 7500	Applied Natural Language Processing in Engineering
IE 7615	Neural Networks and Deep Learning

<sup>1</sup> Students taking electives worth less than 4 semester hours (i.e., Bouvé courses) should enroll for an accompanying data science project course in the same semester to bring the cumulative semester hours to 4. In order to earn this additional hour, students are expected to work with faculty to design an additional project in line with the curricular aims of their chosen elective and the data science core learning outcomes.