# Data Science, MS—Align

Khoury College of Computer Sciences and the Department of Electrical and Computer 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.

The Master of Science in Data Science—Align curriculum is specifically designed to prepare incoming students without any prior programming experience. During the first semester of year one, students are expected to take foundational courses in computer science fundamentals, as well as a course in data structures/discrete mathematics. During their second semester, students will take coursework in programming for data science, as well as linear algebra and probability.

## 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/records-transcripts/).

## Align Bridge Coursework

Students are required to complete all bridge courses unless otherwise determined by the program.

A grade of B or higher is required in each course.

| Code | Title | Hours |
|---|---|---|
| *Fundamentals* | | |
| CS 5001 and CS 5003 | Intensive Foundations of Computer Science and Recitation for CS 5001 | 4 |
| *Discrete Structures* | | |
| CS 5002 | Discrete Structures | 4 |
| *Programming for Data Science* | | |
| DS 5010 | Introduction to Programming for Data Science | 4 |
| Additional Align Coursework | | |
| DS 5020 | Introduction to Linear Algebra and Probability for Data Science | 4 |

## Core Requirements

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

| Code | Title | Hours |
|---|---|---|
| Complete 20 semester hours from the following: | | |
| **Algorithms** | | |
| Complete 4 semester hours from the following: | | 4 |
| CS 5800 | Algorithms | |
| EECE 7205 | Fundamentals of Computer Engineering | |
| **Data Management and Processing** | | |
| DS 5110 | Introduction to Data Management and Processing | 4 |
| **Machine Learning and Data Mining** | | |
| DS 5220 | Supervised Machine Learning and Learning Theory | 4 |
| DS 5230 | Unsupervised Machine Learning and Data Mining | 4 |
| **Presentation and Visualization** | | |
| DS 5500 | Data Science Capstone | 4 |

## Electives [1]

| Code | Title | Hours |
|------|-------|-------|
| Complete 12 semester hours from the following: | | 12 |
| **Khoury College of Computer Sciences** | | |
| 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 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 | |
| DS 7990 | Thesis | |
| DS 7995 | Project | |
| CS 7280 | Special Topics in Database Management | |
| CS 7290 | Special Topics in Data Science | |
| **College of Engineering** | | |
| CIVE 7100 | Time Series and Geospatial Data Sciences | |
| EECE 5612 | Statistical Inference: An Introduction for Engineers and Data Analysts | |
| EECE 5639 | Computer Vision | |
| EECE 5640 | High-Performance Computing | |
| EECE 5645 | Parallel Processing for Data Analytics | |
| EECE 7337 | Information Theory | |
| EECE 7370 | Advanced Computer Vision | |
| EECE 7397 | Advanced Machine Learning | |
| IE 6700 | Data Management for Analytics | |
| IE 7280 | Statistical Methods in Engineering | |
| **College of Social Sciences and Humanities** | | |
| ECON 5140 | Applied Econometrics | |
| PPUA 5261 | Dynamic Modeling for Environmental Decision Making | |
| PPUA 5262 | Big Data for Cities | |
| PPUA 5263 | Geographic Information Systems for Urban and Regional Policy | |
| PPUA 5266 | Urban Theory and Science | |
| PPUA 7237 | Advanced Spatial Analysis of Urban Systems | |
| **College of Science** | | |
| ENVR 5563 | Advanced Spatial Analysis | |
| PHYS 5116 | Network Science 1 | |
| PHYS 7305 | Statistical Physics | |
| PHYS 7321 | Computational Physics | |
| **Bouvé College of Health Sciences** | | |
| PHTH 5202 | Introduction to Epidemiology | |
| PHTH 5210 | Biostatistics in Public Health | |
| PHTH 6224 | Social Epidemiology | |
| **College of Arts, Media and Design** | | |

| GSND 5110 | Game Design and Analysis |
| GSND 6350 | Data-Driven Player Modeling |

## Program Credit/GPA Requirements

40–48 total semester hours required
Minimum 3.000 GPA required

[1]     Students taking electives worth less than 4 SH (i.e., Bouvé courses) should enroll for an accompanying data science project course in the same semester to bring the cumulative SH to 4. In order to earn this additional 1 SH, 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.