DATA SCIENCE (MS)

Department Website (http://cds.nyu.edu)

NYSED: 35896 **HEGIS:** 1702.00 **CIP:** 30.7001

Program Description

The Master of Science in Data Science is a highly-selective program for students with a strong background in mathematics, computer science, and applied statistics. The degree focuses on the development of new methods for data science.

Our networked world is generating a deluge of data that no human, or group of humans, can process fast enough. This data deluge has the potential to transform the way business, government, science, and healthcare are carried out. But too few possess the skills needed to use automated analytical tools and cut through the noise to create knowledge from big data.

A new discipline has emerged to address the need for professionals and researchers to deal with the "data tidal wave." Its objective is to provide the underlying theory and methods of the data revolution. This emergent discipline is known by several names. We call it "data science," and we have created the world's first MS degree program devoted to it.

The curriculum is 36 credits, and offers two ways to structure the graduate program that gives students the opportunity to pursue a specialization through the Industry Concentration or tracks.

Admissions

All applicants to the Graduate School of Arts and Science (GSAS) are required to submit the general application requirements (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc.html), which include:

- Academic Transcripts (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/academic-transcripts.html)
- Test Scores (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/test-scores.html) (if required)
- Applicant Statements (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/statements.html)
- Résumé or Curriculum Vitae
- Letters of Recommendation (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/letters-of-recommendation.html), and
- A non-refundable application fee (https://gsas.nyu.edu/admissions/arc.html#fee).

Admission to the Master of Science in Data Science requires substantial but specific mathematical competencies, typical of a major in mathematics, statistics, engineering, physics, theoretical economics, and computer science with sufficient mathematical training. In addition, applicants should have some training in programming and basic computer science. Preference is given to applicants with prior exposure to machine learning, computational statistics, data mining, large-scale scientific computing, operations research (either in an academic or professional context), as well as to applicants with significantly more mathematical and/or computer science training than the minimum requirements listed above.

See Data Science (https://gsas.nyu.edu/admissions/arc/programs/data-science.html) for admission requirements and instructions specific to this program.

Program Requirements

The program requires the completion of 36 credits, and offers a concentration in Industry. See below for concentration details and requirements.

Course	Title	Credits
Major Requirements		
DS-GA 1001	Introduction to Data Science	3
DS-GA 1002	Probability and Statistics for Data Science	3
DS-GA 1003	Machine Learning	3
DS-GA 1004	Big Data	3
DS-GA 1006	Capstone Project and Presentation	3
Electives		
Data Science Elective		
Select one of the following:		3
DS-GA 1005	Inference and Representation	
DS-GA 1008	Deep Learning	
DS-GA 1011	Fundamentals of Natural Language Processing	
DS-GA 1012	Large Language Models: Evaluation and Applications	
DS-GA 1013	Mathematical Tools for Data Science	
DS-GA 1014	Optimization and Computational Linear Algebra	
DS-GA 1015	Text as Data	
DS-GA 1016	Computational Cognitive Modeling	
DS-GA 1017	Responsible Data Science	
DS-GA 1018	Probabilistic Time Series Analysis	
DS-GA 1020	Mathematical Statistics	
DS-GA 1021	Probability and Statistics 2	
Other Elective Credits		*18*
Total Credits		**36**

Industry Concentration

Students have the opportunity to pursue a specialization through the Industry Concentration. This concentration is specifically targeted to respond to the needs and inputs from companies and allows MS in Data Science students to apply the knowledge and skills obtained in their coursework to industry during the degree program. It requires more industry-targeted coursework and a Practical Training experience. Students in the concentration are required to take the courses below for the degree as a part of the 36 credit requirement.

Concentration Requirements

Course	Title	Credits
Required Course		
DS-GA 1009	Practical Training for Data Science (taken within the first year of the program)	3
Concentration Electives		
Select two electives within the Big Data or Natural Language Processing subjects below. This list is reviewed and approved annually.		6
Big Data		

DS-GA 1012	Large Language Models: Evaluation and Applications
CSCI-GA 2433	Database Systems
CS-GY 6083	Principles of Database Systems
CS-GY 6313	Information Visualization
CS-GY 6323	Large-Scale Visual Analytics
CSCI-GA 2434	Advanced Topics Database Systems
CSCI-GA 2436	Realtime and Big Data Analytics
CSCI-GA 2437	Big Data Application Development
CSCI-GA 3033	Spec Top Computer SCI:
CSCI-GA 3033	Spec Top Computer SCI: (Cloud and Machine Learning)
CSCI-GA 3033	Spec Top Computer SCI: (Introduction to Deep Learning Systems)
INTG1-GC 1025	Database Management & Modeling
MATH-GA 2047	Trends in Financial Data Science
TECH-GB 2350	Robo Advisors & Systematic Trading
Natural Language Processing	
DS-GA 1005	Inference and Representation
DS-GA 1008/ CSCI-GA 2572	Deep Learning
DS-GA 1011	Fundamentals of Natural Language Processing
DS-GA 1012	Large Language Models: Evaluation and Applications
DS-GA 1015	Text as Data
CSCI-GA 2590	Natural Lang Processing
CSCI-GA 3033	Spec Top Computer SCI: (Learning with Large Language and Vision Models)
CSCI-GA 3033	Spec Top Computer SCI: (Statistical NLP)

Capstone (DS-GA 1006)

One of the key features of the MS in Data Science curriculum is a capstone project that makes the theoretical knowledge gained in the program operational in realistic settings. During the project, students go through the entire process of solving a real-world problem; from collecting and processing real-world data, to designing the best method to solve the problem, and finally, to implementing a solution. The problems and datasets come from real-world settings identical to what might be encountered in industry, academia, or government.

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
DS-GA 1001	Introduction to Data Science	3
DS-GA 1002	Probability and Statistics for Data Science	3
Elective (Data Science, General, Industry, or Track)		3
	Credits	**9**
2nd Semester/Term		
DS-GA 1003	Machine Learning	3
DS-GA 1004	Big Data	3
Elective (Data Science, General, Industry, or Track)		3
	Credits	**9**
3rd Semester/Term		
DS-GA 1006	Capstone Project and Presentation	3
Elective (Data Science, General, Industry, or Track)		3
Elective (Data Science, General, Industry, or Track)		3
	Credits	**9**
4th Semester/Term		
Elective (Data Science, General, Industry, or Track)		3
Elective (Data Science, General, Industry, or Track)		3
Elective (Data Science, General, Industry, or Track)		3
	Credits	**9**
	Total Credits	**36**

Learning Outcomes

Upon successful completion of the program, graduates will have:

1. The knowledge and skills needed to develop new methods for data science.
2. The skills needed to use automated analytical tools and cut through the noise to create knowledge from big data.
3. The ability to solve a real-world problem from collecting and processing real-world data, to designing the best method to solve the problem, and finally, to implementing a solution.
4. An awareness of the social and ethical implications of data-driven methods, alongside tools to address and mitigate associated biases.

Policies

NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

Graduate School of Arts and Science Policies

Academic Policies for the Graduate School of Arts and Science can be found on the Academic Policies page (https://bulletins.nyu.edu/graduate/arts-science/academic-policies/).