M.S. in Data Science

M.S. in Data Science (30 credits)
Training Data Scientists

In today's AI-driven economy, there is a strong demand for **data scientists** equipped with computational skills to develop, design and apply models and tools for data-driven decision making. Companies use data science and AI for marketing decisions, targeted customer recommendations, determination of profitable insurance coverage as well as for providing personalized financial advice.

The M.S. in Data Science covers basic and advanced methods in statistical inference, machine learning, data visualization, data mining, and big data, all of which are essential skills for a high-performing data scientist. To be admitted to the program, we require a basic background in Mathematics (calculus, linear algebra), Statistics (probability and basic stats) and Software Development (programming, data structures and algorithms). A GRE score is not required. This part-time degree program involves 10 courses of 3 credits each, (5 core courses and 5 electives), typically taught over 5 semesters of 15 weeks each (including summer). Courses consist of formal lectures as well as hands-on programming projects.

The program curriculum uses the Python programming language with its data science libraries and features tools like R for statistical analysis and Tableau for data visualization. Students work on homework assignments and projects covering both theory and applications on real data with guidance from the professor and teaching assistants.

Recommended part-time credit schedule:
Two courses **(6 credits)** per semester over five consecutive semesters, including Summer. Start is possible in Fall, Spring or Summer semesters.

Core (required) courses:
- ④ **Math 661 Applied Statistics**
- ④ **CS 644 Introduction to Big Data**
- ④ **CS 636 Data Analytics with R Programming**
- ④ **CS 675 Machine Learning**
- ④ **CS 677 Deep Learning**

Sample electives:
- ④ **Math 630 Linear Algebra and Applications**
- ④ **CS 602 Java Programming**
- ④ **CS 610 Data Structures and Algorithms**
- ④ **CS 631 Data Management System Design**
- ④ **CS 632 Advanced Database System Design**
- ④ **CS 634 Data Mining**
- ④ **CS 670 Artificial Intelligence**
- ④ **CS 732 Advanced Machine Learning**
- ④ **CS 735 High Performance Analytics for Data Science**
- ④ **IS 601 Web Systems Development**
- ④ **IS 631 Enterprise Database Management**
- ④ **IS 634 Information Retrieval**
- ④ **IS 665 Data Analytics for Information Systems**
- ④ **IS 687 Transaction Mining and Fraud Detection**
- ④ **IS 688 Web Mining**

NJIT
New Jersey Institute
of Technology

Prerequisites and Admissions:

To be eligible for admission, a student must have a B.S. degree with a minimum GPA of 2.8 on a 4.0 scale and have the following background **(typically obtained through a B.S. in a STEM field)**:

④ **Calculus:** Derivatives, integrals, applications

④ **Linear Algebra:** Vector spaces, dot products, Euclidean norm, matrices

④ **Probability and Statistics:** Random variables, probability distributions, basic statistics

④ **Programming:** Basic programming constructs, writing and debugging programs, iteration, recursion, arrays, lists

④ **Data Structures and Algorithms:** Basic data structures, search and sort, algorithm analysis

Applicants lacking this background may enroll in the Certificate in Big Data Essentials, Certificate in Data Mining or Certificate in Data Visualization, and then continue to the M.S. program while transferring all credit, if they maintain a minimum GPA of 3.0 in the certificate program.

A GRE score is not required.

Program Outcomes:

④ Acquire, clean and manage massive data sets.

④ Design, implement and evaluate advanced statistical models and approaches for application to your company's most complex problems.

④ Provide econometric and statistical models for a variety of problems including projections, classification, clustering, pattern analysis, sampling and simulations.

④ Research new ways for predicting and modeling end-user behavior as well as investigating data summarization and visualization techniques for conveying key applied analytics findings.

④ Apply modern artificial intelligence and deep learning methods to complex prediction and recognition tasks.

④ Visualize large data sets.

For more information and to apply, contact:
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