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 has a duration of 2 years and involves 10 courses of 3 credits each, taught over 6 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:** Fall: 6, Spring: 6, Summer: 3, Fall: 6, Spring: 6, Summer:3. Total: 30 credits over two years (three semesters per year). A spring semester start is also possible.

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

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

**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:
Calculus: Derivatives, integrals, applications
Linear Algebra: Vector spaces, dot products, Euclidean norm, matrices
Probability and Statistics: Random variables, probability distributions, basic statistics
Programming: Basic programming constructs, writing and debugging programs, iteration, recursion, arrays, lists
Data Structures and Algorithms: Basic data structures, search and sort, algorithm analysis

Applicants lacking this background may take the Refresher boot camp to acquire it.

A GRE score is not required.

Program Outcomes:
- Be able to acquire, clean, and manage massive data sets.
- Play an analytical role in your company where you design, implement, and evaluate advanced statistical models and approaches for application to your company’s most complex problems.
- Be able to provide econometric and statistical models for a variety of problems including projections, classification, clustering, pattern analysis, sampling and simulations.
- 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.
- Apply modern artificial intelligence and deep learning methods to complex prediction and recognition tasks.


Possible course sequence for students starting in Fall 2019 (required courses in red):

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