

**DS 701: Exploratory Data Analysis****3  
Credits**

This course introduces data science and highlights its importance in decision making. Students will learn how to analyze data using the R programming language. During the course, students will learn how to import data into R, tidy it, conduct exploratory data analysis, develop visualizations, and draw statistical inferences. The course aims to teach data wrangling, visualization and exploration with R.

[DS701 Course Syllabus](#)

**DS 705: Statistical Methods****3  
Credits**

This course will present statistical methods and inference procedures with an emphasis on applications, computer implementation, and interpretation of results. Familiarity with the R programming language is highly recommended. Topics include simple and multiple regression, model selection, correlation, moderation/interaction analysis, logistic regression, the chi-square test, the Kruskal-Wallis test, analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), factor analysis, and canonical correlation analysis.

*Prerequisite: DS 700 or 701.*

[DS 705 Course Syllabus](#)

**DS 710: Programming for Data Science****3  
Credits**

Introduction to programming languages and packages used in data science.

[DS 710 Syllabus](#)

**DS 716: Data Management for Data Science****3  
Credits**

This course explores the various approaches for data management used in data science. We present how data is collected, transformed, stored, and delivered for use in data science projects.

[DS 716 Course Syllabus](#)

**DS 730: Big Data: High-Performance Computing****3  
Credits**

This course prepares you to process large data sets efficiently. You will be introduced to nonrelational databases and algorithms that allow for the distributed processing of large data sets across clusters.

*Prerequisite: DS 710*

[DS 730 Syllabus](#)

**DS 740: Data Mining & Machine Learning****3  
Credits**

Explore data mining methods and procedures for diagnostic and predictive analytics. Topics include association rules, clustering algorithms, tools for classification, and ensemble methods. Computer implementation and applications will be emphasized.

*Prerequisites: DS 705 and DS 710.*

[DS 740 Syllabus](#)

**DS 750: Data Storytelling****3  
Credits**

Data storytelling involves using data to tell a compelling narrative that helps audiences understand, engage with, and act on the information. This course combines data analysis with communication techniques to present data in an informative and engaging way. This course is specifically designed as a graduate-level requirement for the MSDS degree, focusing on teaching students how to effectively communicate insights through data storytelling techniques. Participants will learn to craft engaging stories that resonate with various audiences and drive decision-making.

*Prerequisites: DS 700 or 701. DS 705 OR DS 740 suggested but not required.*

[DS750 Course Syllabus](#)

**DS 770: Ethical Decision-Making Using Data****3  
Credits**

This course examines how data science relates to developing strategies for organizations. The emphasis is on using an organization's data assets to inform better decisions. The course investigates the use of data science findings to develop solutions to competitive organizational challenges. Special attention is given to critically examining decisions to ensure that they are ethical and avoid unfair bias. Professional codes of conduct as well as local and international regulations are also considered.

*Prerequisites: DS 740 suggested but not required.*

[DS770 Course Syllabus](#)

**DS 776: Deep Learning****3  
Credits**

Introduction to the theory and applications of deep learning. The course begins with the study of neural networks and how to train them. Various deep learning architectures are introduced including convolutional neural networks, recurrent neural networks, and transformers. Applications may include image classification, object detection, and natural language processing. Algorithms will be implemented in Python using a high-level framework such as Pytorch or TensorFlow.

*Prerequisites: DS 740.*

[DS 776 Course Syllabus](#)

**DS 785: Capstone****3  
Credits**

Students will develop and execute a data science project using real-world data and communicate results to non-technical audiences.

*Prerequisites: DS715 or DS716, DS730, DS740, DS750 or completion of 27 credits.*

[Sample Capstone Projects](#)

[DS 785 Syllabus](#)