## ANALYTICS (DATA)

### DATA 557 - Introduction to Data Science and Analytics
**Credits:** 4
An introduction to data science and analytics. The landscape of analytics, including an overview of industries and sectors using analytics or expected to use analytics in the near future. Data generation, data management, data cleaning, and data preparation. Ethical use of data. Focus on visual and exploratory analysis. Project-based, with an emphasis on collaborative, experiential learning. Programming and statistical software will be used, but previous experience is not required.
**Attributes:** Environment, TechSociety(Disc)

### DATA 674 - Predictive and Prescriptive Analytics I
**Credits:** 4
A first course in predictive and prescriptive analytics. Supervised learning models including linear models and CART models. Model assessment and scoring methods, including cross-validation. Regularization and model tuning. Unsupervised learning models including k-means clustering. Project-based, with an emphasis on collaborative, experiential learning. Statistical software will be used and programming required.
Prereq: MATH 425, COMP 490, DATA 557, or permission of the instructor.

### DATA 675 - Predictive and Prescriptive Analytics II
**Credits:** 4
A second course in predictive and prescriptive analytics. Time series analysis and model ensembles. Bootstrapping, simulation, optimization. Monte Carlo methods. Project-based, with an emphasis on collaborative experiential learning. Statistical software will be used and programming required. Prereq: DATA 674 or permission of the instructor.

### DATA 690 - Internship Experience
**Credits:** 3
A field-based learning experience via placement in a business, non-profit, or government organization using analytics. Under the guidance of a faculty advisor and workplace supervisor, students gain practical experience solving problems and improving operational processes using analytics. Prereq: UMST 599: Internship and Career Planning Seminar.

### DATA 750 - Neural Networks
**Credits:** 4
Artificial neural networks power the recent advances in computer vision, speech recognition, and machine translation. This is a first course on neural networks with a focus on applications in computer vision and natural language processing. Topics will include generic feedforward neural networks, convolutional neural networks for computer vision tasks, and recurrent neural networks with application to natural language processing, with other topics to be selected based on the interests of the instructor and the class. Prereq: MATH 425, MATH 545 or MATH 645, COMP 490, or permission of the instructor. Also listed as COMP 750.
**Equivalent(s):** DATA 751

### DATA 757 - Big Data
**Credits:** 4
A first course in large-scale analytics and data science. Characteristics of big data and the emerging software stack for working with massive datasets, including Hadoop and MapReduce. Algorithms for extracting information from massive datasets. A first course in linear algebra is not a prerequisite, but is recommended. Prereq: MATH 425, DATA 557, or instructor permission.

### DATA 790 - Capstone Project
**Credits:** 4
Under direction of a faculty mentor, students work in teams to find solutions to complex real-world problems using analytics. Projects may come from internal or external sources. Students define the problem, obtain the necessary data, develop suitable models and solutions, and present their results. Prereq: Senior standing in Analytics B.S. program.

### DATA 796 - Data Analytics Lab Independent Study
**Credits:** 4
This class is a student independent study centered around a faculty-facilitated but student-directed analytic project. The class requires competency in two areas for successful completion: Data collection/cleaning and data mining/analysis. Students will be responsible to apply modern analytical tools and techniques such as predictive modeling, segmentation, network analysis and others to real world problems and data. They will be required to present their findings during the course and at its completion as well as write a formal report of methods and findings with modern data visualizations synthesized throughout.