Data Science (DS) - Graduate Courses

Courses

DS 700 Cr.3
Foundations of Data Science
This course provides an introduction to data science and highlights its importance in business decision making. It provides an overview of commonly used data science tools along with spreadsheets, relational databases, statistics and programming assignments to lay the foundation for data science applications. Prerequisite: admission to a graduate Data Science Program. Consent of department. Offered Fall, Spring.

DS 705 Cr.3
Statistical Methods
Statistical methods and inference procedures will be presented in this course with an emphasis on applications, computer implementation, and interpretation of results. Topics include simple and multiple regression, model selection, correlation, moderation/interaction analysis, logistic regression, chi-square test, ANOVA, Kruskal-Wallis test, MANOVA, factor analysis, and canonical correlation analysis. Prerequisite: DS 700; admission to MS in Data Science. Consent of department. Offered Fall, Spring.

DS 710 Cr.3
Programming for Data Science
Introduction to programming languages and packages used in data science. Prerequisite: admission to a graduate Data Science Program. Consent of department. Offered Fall, Spring.

DS 715 Cr.3
Data Warehousing
Introduce the concepts and techniques to work with and reason about subject-oriented, integrated, time-variant, and nonvolatile collections of data in support of management's decision-making process. Prerequisite: admission to a graduate Data Science Program. Consent of department. Offered Fall, Spring.

DS 730 Cr.3
Big Data: High Performance Computing
This course will teach students how to process large datasets efficiently. Students will be introduced to non-relational databases. Students will learn algorithms that allow for the distributed processing of large datasets across clusters. This course will teach students how to process large datasets efficiently. Prerequisite: DS 710 or concurrent enrollment; admission to MS in Data Science. Consent of department. Offered Fall, Spring.

DS 735 Cr.3
Communicating about Data
This course will prepare students to master technical, informational and persuasive communication to meet organizational goals. Technical communication topics include a study of the nature, structure and interpretation of data. Informational communication topics include data visualization and design of data for understanding and action. Persuasive communication topics include the study of written, verbal and nonverbal approaches to influencing decision makers. Prerequisite: admission to a graduate Data Science Program. Consent of department. Offered Fall, Spring.

DS 740 Cr.3
Data Mining and Machine Learning
This course covers data mining and machine learning 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. Prerequisite: DS 700, DS 710; admission to graduate Data Science Program. Consent of department. Offered Fall, Spring.

DS 745 Cr.3
Visualization and Unstructured Data Analysis
This course covers two aspects of data analytics. First, it teaches techniques to generate visualizations appropriate to the audience type, task, and data. Second, it teaches methods and techniques for analyzing unstructured data - including text mining, web text mining and social network analysis. Prerequisite: DS 740; admission to MS in Data Science. Consent of department. Offered Fall, Spring.

DS 760 Cr.3
Ethics of Data Science
This course will focus on the investigation of ethical issues in computer science that ultimately also pertains to data science, including privacy, plagiarism, intellectual property rights, piracy, security, confidentiality and many other issues. Our study of these issues will begin broadly, with a look at ethical issues in computer science at large. We will then make inferences to the narrower field of data science. We will consider ethical arguments and positions, the quality and integrity of decisions and inferences based on data, and how important cases and laws have shaped the legality, if not the morality, of data science related computing. Case studies will be used to investigate issues. Prerequisite: DS 740; admission to MS in Data Science. Consent of department. Offered Fall, Spring.

DS 775 Cr.3
Prescriptive Analytics
This course covers procedures and techniques for using data to inform the decision-making process. Topics include optimization, decision analysis, game theory, and simulation. Case studies and applications will be emphasized. Prerequisite: DS 705, DS 710; admission to MS in Data Science. Consent of department. Offered Fall, Spring.

DS 780 Cr.3
Data Science and Strategic Decision Making
This course examines how data science relates to developing strategies for business organizations. The emphasis is on obtaining decision-making value from an organization's data assets. The course will investigate the use of data science findings to develop solutions to competitive business challenges. Case studies will be reviewed to examine how data science methods can support business decision-making. A range of methods the data scientist can use to get people within the organization onboard with data science projects will be reviewed. The future of data science as a decision-making tool will be explored. Prerequisite: admission to MS in Data Science. Consent of department. Offered Fall, Spring.

DS 785 Cr.3
Capstone
Capstone course in which students will develop and execute a project involving real-world data. Projects will include: formulation of a question to be answered by the data; collection, cleaning and processing of data; choosing and applying a suitable model and/or analytic method to the problem; and communicating the results to a non-technical audience. Prerequisite: DS 700, DS 705, DS 710, DS 715, DS 730, DS 735, DS 740, DS 745, DS 775; admission to MS in Data Science. Consent of department. Offered Fall, Spring.