

Data Science MS (DASC)

COURSES

DASC 5191. ADVANCED STUDY IN DATA SCIENCE. 1 Hour.

Individual research projects in Data Science. Prior approval of the DASC Graduate Advisor is required for enrollment. A written report is required. Graded F, I, P.

DASC 5300. FOUNDATION OF COMPUTING. 3 Hours.

Basics of programming, data structures, and algorithms. Introduction operating systems. Basics of discrete structures and computability. Course is used for the Master's in Data Science degree program and certificate programs for non-CSE majors. It cannot be taken for credit towards any CSE degree. Prerequisite: DASC Major.

DASC 5301. DATA SCIENCE. 3 Hours.

This inspirational course follows a data-science-for-all perspective that views data acumen as part of literacy. It aims to instill in students the data acumen, i.e., the basic skills to wrestle with data, to draw insights from data, to make sound decisions responsibly using data, and to effectively communicate about data-driven findings and decisions. Topics include 1) data management: data curation, preparation, model, and querying; 2) data description and visualization: exploratory data analysis; graphics; 3) machine learning and knowledge discovery: supervised learning, unsupervised learning, pattern and knowledge extraction, model evaluation and interpretation. Prerequisite: DASC Major, DASC 5300 (or concurrent enrollment) and DASC 5302 (or concurrent enrollment).

DASC 5302. INTRODUCTION TO PROBABILITY AND STATISTICS. 3 Hours.

Topics include descriptive statistics, set theory, combinatorics, mathematical expectation, probability distributions, confidence interval estimation, analysis of variance, random processes, and design of experiments. Prerequisite: DASC Major.

DASC 5303. DATA SCIENCE PROJECT MANAGEMENT. 3 Hours.

Management and control of multifaceted science and engineering projects. Coordination and interactions between client and various service organizations. Project manager selection. Typical problems associated with various phases of project life cycle. Case studies illustrate theories and concepts. Students will be expected to demonstrate an understanding of communication and collaboration, including workflow, reproducibility, codebase management, collaboration tools, oral and written communication, presentation and storytelling, and team management, as well as ethics, such as understanding bias, fairness, credibility and misinformation, security, privacy, and codes of conduct. Prerequisite: DASC Major, DASC 5300, DASC 5301, DASC 5302.

DASC 5304. MACHINE LEARNING. 3 Hours.

Introduction to methods, concepts, analysis, and applications of modern Machine Learning. Topics include Unsupervised as well as Supervised learning with a central focus on practical and application aspects in the area of Data Science. Prerequisite: DASC MAJOR: DASC 5300, DASC 5301, DASC 5302.

DASC 5305. DATA VISUALIZATION. 3 Hours.

Issues, methods, and tools for data visualization for the effective presentation and analysis of data. Covers techniques for the creation and delivery of compelling visual representations and data-driven stories to enhance the delivery of analysis results, as well as visualization methods to extract meaningful information from data and to select appropriate data science methods. Prerequisite: DASC Major, DASC 5304 (or concurrent enrollment).

DASC 5306. BIG DATA MANAGEMENT. 3 Hours.

Introduction to data management and processing techniques in relational and other databases as well as computing systems. Topics include the relational model, query languages and methods, data management approaches, technologies and software tools with a focus on practical data science applications. Prerequisite: DASC Major, DASC 5300, DASC 5301, DASC 5302.

DASC 5309. DATA SCIENCE CAPSTONE PROJECT. 3 Hours.

Students will design, develop and present a substantial data science project by applying the knowledge and skills acquired from relevant courses. The projects will be drawn from real-world applications and data and might involve collaboration with community partners. Prerequisite: DASC 5300, DASC 5301, DASC 5302, DASC 5304, DASC 5305, DASC 5306.

DASC 5391. DATA SCIENCE APPLICATIONS. 3 Hours.

Individually approved research or industry internship in data science. Prerequisite: DASC 5300, DASC 5301, DASC 5302, DASC 5304, DASC 5305, DASC 5306 and Graduate Advisor approval.

DASC 5392. TOPICS IN DATA SCIENCE. 3 Hours.

May be repeated for credit when the topics vary. Prerequisite: DASC Major, DASC 5300, DASC 5301, DASC 5302 and consent of instructor.