

DASC - Data Science

DASC 205S Data, Technology, Society (3 Credit Hours)

This course investigates how data science is transforming not only our sense of science and scientific knowledge, but our sense of ourselves and our communities and our commitments concerning human affairs and institutions generally. Social implications of the digital revolution, including ethical issues associated with algorithmic design and privacy will be examined. Students will use a sociological lens to explore how our increasingly digital lifestyle changes institutions and social relations.

DASC 300 Foundations of Data Science (3 Credit Hours)

This course provides an interdisciplinary overview of data sciences drawing on key elementary topics related to data analytics. A specific focus is given to the way that decisions made about data from those disciplinary pursuits inform policy, product development, and humanity. Topics addressed include elements of data, data collection, the connections between machine learning and data, survey research, programming with Python and R, statistical learning, model evaluations, digital engineering, and ethical uses of data.

Prerequisites: junior standing

DASC 357E Ethics and Data (3 Credit Hours)

This course explores, from a philosophical perspective, ethical questions arising from collecting, drawing inferences from, and acting on data, especially when these activities are automated and on a large scale. This course will provide students a framework for considering the ethical implications of data usage. Emphasis will be placed on discussing how historic and contemporary examples of potentially unethical practice could be altered to reduce harm and increase equity. Topics to be covered may include, but are not limited to, systematic approaches to assessing ethical issues; privacy and confidentiality; defining research and the responsibilities associated with conducting ethical research; implicit and structural biases in data collection and analysis; freedom of speech; and consent to data collection.

Prerequisites: ENGL 110C

DASC 368 Data Science Internship (1-6 Credit Hours)

This course allows students to work for an employer in a position related to data science. Students must work for 50 hours per course credit and complete course assignments.

Prerequisites: approval by the program coordinator

DASC 434 Data Science Research Methods (3 Credit Hours)

An overview of the scientific approach to the study of phenomena through large scale quantitative approaches. The course includes the development of a research proposal that will be carried out in the Data Science Capstone Project course.

Prerequisites: ENGL 110C

DASC 436W Data Science Capstone Project (3 Credit Hours)

Students work individually or in groups to plan, design, and carry out a research project demonstrating expertise with data science. Final papers that report the results for the study are presented in a formal research seminar. The projects reflect knowledge gained from undergraduate work and training received in discipline-specific research methods and statistics courses. This is a writing intensive course.

Prerequisites: ENGL 211C/ENGL 221C/ENGL 231C with a grade of C or better and senior standing

DASC 494 Entrepreneurship in Data Science (3 Credit Hours)

This course is designed to help students enhance their personal and professional development through innovation guided by faculty members and professionals. It offers students an opportunity to integrate disciplinary theory and knowledge through developing a nonprofit program, product, business, or other initiative. The real-world experiences that entrepreneurs provide will help students understand how academic knowledge leads to transformations, innovations, and solutions to different types of problems. The course can be delivered either as an independent project for individual students or as group projects similar to those sometimes offered in topics courses.

Prerequisites: junior standing

DASC 496/596 Topics in Data Science (3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

Prerequisites: junior standing

DASC 497/597 Independent Study (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: senior standing and approval of the program coordinator

DASC 596 Topics in Data Science (3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described in information distributed to academic advisors.

DASC 597 Independent Study (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: approval of the program coordinator

DASC 620 Introduction to Data Science and Analytics (3 Credit Hours)

This course will explore data science as a burgeoning field. Students will learn fundamental principles and techniques that data scientists employ to mine data. They will investigate real life examples where data is used to guide assessments and draw conclusions. This course will introduce software and computing resources available to a data scientist to process, visualize, and model different types of data including big data. Cross-listed with CS 620.

DASC 690 Data Science Capstone Project (3 Credit Hours)

The culminating course in the proposed MS in Data Science and Analytics degree program will bring students together with faculty and external partners. In consultation with a faculty advisor and a business or industry or government representative, students will be required to develop a project that aims to solve a data science/analytics problem in a real-world business, industry, or government setting. Faculty and business/industry/government representatives will serve as external mentors for the students during this experience. Note that an external mentor is not mandatory but encouraged.

Pre- or corequisite: DASC 620/CS 620, CS 624, CS 625, and STAT 603

DASC 771 Fundamentals of Interpretable Machine Learning and Explainable AI (3 Credit Hours)

Laws in many countries and states within the U.S. require that predictive models impacting humans be accompanied by an understandable interpretation, yet many such models are based on so called black box models that can't be easily interpreted or explained. This course will enable students to produce explanations and interpretations for advanced ML and AI algorithms. It will review the state of the science methods for interpretable ML and explainable AI, including graphical and contextual approaches as well as model agnostic and model specific methods for generating understandable explanations and interpretations. The course will also introduce the concepts of algorithmic bias and model fairness as they relate to explanation and understanding.

Prerequisites: BDA 511/611, or CS 522, or CS 580

DASC 795 Topics in Data Science (3 Credit Hours)

Provides the advanced student with an opportunity to study and investigate a variety of topics in the field of data science.

DASC 871 Fundamentals of Interpretable Machine Learning and Explainable AI (3 Credit Hours)

Laws in many countries and states within the U.S. require that predictive models impacting humans be accompanied by an understandable interpretation, yet many such models are based on so called black box models that can't be easily interpreted or explained. This course will enable students to produce explanations and interpretations for advanced ML and AI algorithms. It will review the state of the science methods for interpretable ML and explainable AI, including graphical and contextual approaches as well as model agnostic and model specific methods for generating understandable explanations and interpretations. The course will also introduce the concepts of algorithmic bias and model fairness as they relate to explanation and understanding.

Prerequisites: BDA 511/611, or CS 522, or CS 580

DASC 895 Topics in Data Science (3 Credit Hours)

Provides the advanced student with an opportunity to study and investigate a variety of topics in the field of data science.