DATA SCIENCE (DS)

DS 100
Introduction to the Profession
Introduces students to data science as a profession, as currently practiced and continuing to develop. Presents various elements of the data science life cycle at an introductory level, culminating with a start-to-finish data analysis project. Includes guest lectures from data science practitioners and faculty. Explores real-world examples of ethical issues, bias, and privacy in data science. Survey careers in data science and familiarize students with elements of career development.
Lecture: 3 **Lab:** 0 **Credits:** 3

DS 151
Introduction to Data Science
This course introduces the critical concepts and skills in statistical inference, machine learning, and computer programming, through hands-on analysis of real-world datasets from various fields.
Lecture: 3 **Lab:** 0 **Credits:** 3

DS 251
Mathematical Foundations for Data Science I
This course introduces the critical mathematical foundation knowledge for data science. Specifically, this course covers the basic topics on linear algebra and discrete math that are most relevant to the data science major.
Prerequisite(s): MATH 251
Lecture: 3 **Lab:** 0 **Credits:** 3

DS 261
Ethics and Privacy in Data Science
This course introduces the critical concepts and skills of ethics and privacy in data science, as well as hands-on implementation of important algorithms. It will cover important concepts of bias and privacy, and the computational strategies to ensure fairness and privacy in a variety of emerging data science applications. The course provided hands-on experience in collecting, analyzing, and modeling data for tackling ethical issues.
Lecture: 3 **Lab:** 0 **Credits:** 3

DS 351
Mathematical Foundations for Data Science II
This course introduces mathematical tools from optimization, differential equations, and numerical analysis etc. that are relevant to the data science major.
Prerequisite(s): DS 251
Lecture: 3 **Lab:** 0 **Credits:** 3

DS 451
Data Science Life Cycle
This course is designed to educate the data science students in the typical project life-cycle stages required in the data science professions. Stages of a data science project from start to finish such as obtaining data, exploring data, determining what questions the data can answer, exploratory analysis, ethical impacts analysis and mitigation, hypothesis (re-)formulation, in-depth analysis, validation, and reporting, are presented.
Prerequisite(s): DS 251 or MATH 484 or CS 484 or CS 422
Lecture: 3 **Lab:** 0 **Credits:** 3

DS 472
Data Science Practicum
In this project-oriented course, students will work in small groups to solve real-world data analysis problems and communicate their results. Innovation and clarity of the presentation will be key elements of evaluation. Students will have an option to do this as an independent data analytics internship with an industry partner.
Prerequisite(s): DS 451 or CSP 571
Credit: Variable

DS 480
Data Science Projects
In this capstone course, students will work in teams to explore a data-rich real-world issue from business, industry, government, or scientific research. Teams will identify a problem, then model, solve, and communicate their solution using data science techniques such as data mining, regression, machine learning, hypothesis testing, and data visualization. Emphasis will be placed on team building, planning, reflection and course correction, and reporting in written and presentation form. Ethics and privacy implications will be identified and explored, so that each team conducts the modeling and reporting process appropriately.
Prerequisite(s): CS 422 or CS 484 or DS 451 or MATH 476 or MATH 484
Lecture: 3 **Lab:** 0 **Credits:** 3