

Data Science Academy Courses (DSA)

DSA 201 Introduction to R/Python for Data Science (1 credit hours)

Students will develop introductory skills in R and Python needed for data science. Topics include data types, data structures, control structures, good coding practices, and reproducible coding. Students will become acquainted with basic data science techniques and their implementations in R and Python. Skills acquired in this course serve as a foundation for many of the Data Science Academy classes that suggest some experience with R or Python.

Typically offered in Fall, Spring, and Summer

DSA 202 Introduction to Data Visualization (1 credit hours)

Visualizations can be one of the most effective means to communicate quantitative information. Students will cover the principles of effective visualization and how to interpret data displays. Students will evaluate current examples in the media and learn tools for creating static, interactive, and dynamic data displays.

Typically offered in Fall, Spring, and Summer

DSA 205 Data Communication (1 credit hours)

Knowing how to analyze your data is only half the job: You need to be able to present your research in a manner that your audience can understand. Presentations should be clear, engaging, and include a minimum of the jargon that can bog down discussion of scientific concepts. This course will raise your awareness of our jargon-infused everyday conversation, introduce concepts for connecting with your audience and meeting them where they are, and offer tips for clear writing and accessible design of graphs and presentation slides.

Typically offered in Fall, Spring, and Summer

DSA 220 Introduction to AI Ethics (1 credit hours)

Organizations leverage Artificial Intelligence (AI) to make decisions, analyze data, speed up processes, and cut costs. There are frequent consequences (both positive and negative) of the use of AI in this capacity that point to several ethical concerns. Through a semester-long qualitative research project, students will explore the ethical use of AI within their chosen industry or field of study. Prerequisites: None.

Typically offered in Fall, Spring, and Summer

DSA 225 Data Science for Social Good (1 credit hours)

Data science offers powerful tools for addressing a multitude of societal challenges, yet it is no panacea and will require collaboration and commitment from across society to fulfill its promise. Students will investigate the growing use of data science in the social impact space, drawing from real-world examples aligned with the United Nations' Sustainable Development Goals. These examples will span practice areas and approaches, including machine learning, natural language processing, and image recognition. Students will discuss the challenges of implementing data science for social good solutions, including considerations of community involvement, bias, & equity and identify best practices.

Typically offered in Fall, Spring, and Summer

DSA 235 Introduction to Data Science for Cybersecurity (1 credit hours)

The vast majority of individuals in the U.S. have been exposed to cybersecurity threats (cisa.gov). Personal and economic effects can be devastating. Students will investigate the use of data to discover, explore, and address relevant cybersecurity use cases. Students will become familiar with fundamental approaches to tackle common cybersecurity problems using Python.

Typically offered in Fall, Spring, and Summer

DSA 240 Measuring Success (1 credit hours)

Students will explore the crucial interplay between user experience (UX), data analysis, and software success. Through comprehensive usability testing, students will gain experience in analyzing user needs and feedback, and will directly link these insights to the overall success of software projects. Students will utilize data analysis and visualization techniques applied to UX metrics to clearly articulate a detailed understanding of user interactions and satisfaction. Topics include software efficacy, user retention, iterative testing and more, with a focus on effective communication and stakeholder engagement. Students will use techniques from the class and engage directly with users to develop inclusive solutions for diverse user groups and guide data-driven enhancements in the software industry.

Typically offered in Fall, Spring, and Summer

DSA 295 Introductory Special Topics in Data Science (1-3 credit hours)

Offered as needed to present material not normally available in regular departmental course offerings or for offering new courses on a trial basis. Students may repeat this course under a different topic. DSC 295 (Level 1) courses do not require any previous data science knowledge or skills.

Typically offered in Fall, Spring, and Summer

DSA 405 Data Wrangling and Web Scraping (1 credit hours)

Finding, cleaning, and preparing data is often required prior to conducting any data analysis. Data wrangling often accounts for the majority of the time spent working with data and learning these concepts is fundamental to the data science process. Students will learn how to manipulate and clean data for analyses and visualizations, read data from web pages, and merge multiple data sets of reasonable sizes. Prerequisite Skills and Knowledge: Students should enter the course with basic knowledge of a programming language (such as R or Python).

Typically offered in Fall, Spring, and Summer

DSA 406 Exploratory Data Analysis for Big Data (1 credit hours)

Exploratory data analysis (EDA) focuses on summarizing the main characteristics of data sets, often using visualization methods. The goal is not formal modeling or hypothesis testing, but understanding and exploring data to formulate hypotheses for further investigation. Students will use techniques of EDA and generalize those approaches to large data sets. Prerequisite skills and knowledge: Students should enter the course with some basic programming experience, such as experience using and familiarity with R or Python.

Typically offered in Fall, Spring, and Summer

DSA 410 Data Internship Preparation for Social Impact (1 credit hours)

Students will prepare to apply for internships for social impact in nonprofits, governmental organizations, and community organizations. As part of this preparation, students will become familiar with tools (such as a data maturity questionnaire) that can help organizations assess their own use of data, and use assessment results to initiate conversations about the organization's data practices and goals. Students will learn about the appropriate scope of projects for an internship, and practice some basic data management, analysis, and visualization through a mini-project utilizing data from real organizations with a focus on social impact. Additional emphases include developing and refining interviewing skills, professional and personal networks, job applications, and job selection. Prerequisite skills: Some elementary data science experience that could be applied in an internship.

Typically offered in Fall, Spring, and Summer

DSA 412 Exploring Machine Learning (1 credit hours)

Machine learning (ML) is a fundamental component of artificial intelligence. Students will deconstruct the basic ideas behind popular ML algorithms, such as logistic regression or K-means, using a project-centered approach. Students will create projects from successful ML use cases tailored to their specific domains of interest. Prerequisite skills and knowledge: Students should have basic knowledge of a programming language (e.g., R, Python, or others), experience with appropriate use of data structures (e.g., lists and matrices), and flow control mechanisms, such as loops. Students should also be familiar with matrix-vector multiplication and the norm of a vector.

Typically offered in Fall, Spring, and Summer

DSA 495 Special Topics in Data Science (1-3 credit hours)

Offered as needed to present material not normally available in regular departmental course offerings or for offering new courses on a trial basis. Students may repeat this course under a different topic. DSC 495 (Level 2) courses are more advanced than DSC 295 (Level 1) courses and have skill-based prerequisites. Students, please note that the course description will include suggested skills and/or topical knowledge. Please prepare accordingly.

Typically offered in Fall, Spring, and Summer

DSA 595 Graduate Special Topics in Data Science (1-3 credit hours)

Offered as needed to present material not normally available in regular departmental course offerings or for offering new courses on a trial basis. Students may repeat this course under a different topic.

R: Graduate Standing or permission from the Data Science Academy.

Typically offered in Fall, Spring, and Summer