**Academy of Data Science (DSC)**

**DSC 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*

**DSC 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*

**DSC 205 Data Communication** (1 credit hours)
Employers want to hire people who can communicate to a wide variety of audiences. Many disciplines have their own specialized language or jargon. It is easy to fall into the habit of using that jargon to communicate data analysis results or concepts to the public, or to “cherry-pick” and selectively present data or results to convey a specific idea. Students will fine-tune their awareness regarding the use of discipline-specific language. Students will present scientific results and concepts clearly, unambiguously, and with a minimum of jargon.

*Typically offered in Fall, Spring, and Summer*

**DSC 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*

**DSC 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*

**DSC 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*

**DSC 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*

**DSC 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*

**DSC 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*

**DSC 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 projects-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*
DSC 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

DSC 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