

UNDERGRADUATE COURSES OF STUDY

DATA SCIENCE

DSCI 120.AI LITERACY AND CRITICAL THINKING

This course is designed to introduce students to the fundamentals of artificial intelligence (AI) and its impact on society, ethics, and critical thinking. Students will explore key AI concepts, common applications, and their implications in various fields. Through discussions, case studies, and hands-on activities, students will critically evaluate AI technologies, their benefits, and potential risks. (General Education – Scientific and Mathematical Reasoning). *Three credit hours.*

DSCI 130.INTRODUCTION TO DATA SCIENCE

This course introduces data science history, fundamental data concepts, principles, problem definitions, algorithms, processes for extracting patterns, and legal and privacy issues. Data mining and machine learning concepts and software are also introduced. *Three credit hours.*

DSCI 230.INTRODUCTION TO DATA SCIENCE PROGRAMMING

This course introduces fundamental programming techniques for data science such as loading, cleaning, transforming, merging, and reshaping data. Data types, building a data pipeline for simple predictions, and the analysis and manipulation of time series data are also discussed. Prerequisites: DSCI 130. *Four credit hours.*

DSCI 231.DATA VISUALIZATION

This course introduces methods and software tools for the visual representation of data. It introduces visual techniques for summarizing data and for exploratory data analysis. Students will complete a data visualization project and presentation. Prerequisites: DSCI 230 and MATH 211. *Three credit hours.*

DSCI 330.BIG DATA ANALYSIS

This course covers advanced tools for big data analysis including unstructured databases and data management platforms. It provides an overview of the architectural components and programming models used for scalable big data analysis. Students will identify and examine real world big data problems and recast these in ways that can be addressed with data science methods. Prerequisites: DSCI 230 and CIS 360. *Three credit hours.*

DSCI 340.APPLIED MACHINE LEARNING

This course focuses on the application of machine learning algorithms applied to very large structured datasets. Topics include data preparation, pipeline construction, machine learning models and their hyperparameters, overfitting and underfitting, regularization, performance measurement, and application development in the cloud. Prerequisites: DSCI 230 and MATH 213. *Three credit hours.*

DSCI 440.APPLIED DEEP LEARNING

This course is an applied study of algorithms and models to perform deep learning on very large unstructured datasets, such as images, and texts. Topics include artificial neural networks, deep neural networks, deep learning models and training algorithms, optimizers, preparation of training data, measuring performance, and developing applications over the cloud. Prerequisites: DSCI 230 and MATH 214. *Three credit hours.*

DSCI 499.DATA SCIENCE CAPSTONE

In this capstone course, students will complete a real-world data science project requiring the application of advanced techniques. Projects will encompass the data science curriculum and will include data acquisition, cleansing, manipulation, and visualization. Data will be used to develop models to make predictions or discover patterns in order to answer questions or make decisions in real-world settings. Prerequisite: Permission of Instructor. *Three credit hours.*