

# DATA SCIENCE (DSCI)

## DSCI-200 Introduction to Data Science 4 Credits

This course will introduce students to this rapidly growing field and equip them with some of its basic principles and tools as well as its general mindset. Students will learn the concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling, data product creation, evaluation and effective communication. A laboratory component will be included.

Prerequisite: CSCI-208 or CSCI-218

Terms Typically Offered: Fall, odd years.

## DSCI-350 Data Mining 3 Credits

Recommended CSCI-340. Data Mining studies algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data. It is currently regarded as the key element of a more general process called Knowledge Discovery that deals with extracting useful knowledge from raw data. The knowledge discovery process includes data selection, cleaning, coding, using different statistical and machine learning techniques, and visualization of the generated structures. The course will cover all these issues and will illustrate the whole process by examples. Special emphasis will be given to the Machine Learning methods as they provide the real knowledge discovery tools. Important related technologies such as data warehousing and online analytical processing (OLAP), will be also discussed. The students will use recent Data Mining software.

Terms Typically Offered: Spring, even years.

## DSCI-410 Data Visualization 3 Credits

Visualization is increasingly important in this era where the use of data is growing in many different fields. Data visualization techniques allow people to use their perception to better understand this data. The goal of this course is to introduce students to data visualization including both the principles and techniques. Students will learn the value of visualization, specific techniques in information visualization and scientific visualization, and understand how best to leverage visualization methods.

Prerequisite: DSCI-350

Terms Typically Offered: Fall, odd years.

## DSCI-415 Experimental Design, Statistical Analysis 3 Credits

Introduces advanced statistical concepts and analytical methods for the experimental needs and data encountered in computer, data and physical sciences. Experimental design/conduct, quantitative analysis of data, and statistical inferences and interpretations are studied for scientific hypothesis testing, as well as clinical trials. Explores methodological approaches to bioassay development/testing and provides a foundation for critically evaluating information to support research findings, product claims, and technology opportunities. Students apply statistical analysis software and write algorithms in programming languages commonly used in technology and professional science industries (ie. Python). Topics include statistical tools such as Bayesian statistics, Markov processes, and information theoretic indices.

## DSCI-450 Ug Research Internship Program 1-4 Credits

This course may be taken for a maximum of four (4) units in one semester. A maximum of six (6) combined unit credits for DSCI-450 or DSCI-485 apply to graduation. This course is designed with the purpose of providing students the opportunity to conduct research off-campus at universities or companies in the community. This course promotes early entry into the workplace for the student through part-time employment. This course requires actual work experience be sought in an appropriate business firm providing an opportunity to integrate classroom teaching in practical application under the direct supervision of the assigned instructor. Students are responsible for completing a project report and presenting their research results in DSCI-499C

Terms Typically Offered: Summer.

## DSCI-485 Undergraduate Data Science Research 1-4 Credits

This course provides the student with an empirically-based research experience in the data sciences. Emphasis will be placed on project management, software development, and research documentation skills. This course is a variable credit course. Two units are recommended for all data science majors. It is expected that a research report be completed at the conclusion of the research project and an oral presentation of the results be given in DSCI-499C. This course may be repeated for credit. Lab fee.

Terms Typically Offered: Summer.

## DSCI-488 Computer Science Senior Project 2 Credits

An advanced course providing the opportunity for a student to create a novel and independent intellectual work by comparing, contrasting and synthesizing recent research and his/her cumulative knowledge and understanding in the computer sciences. The precise nature, scope and format of the project must be developed and approved under the guidance of the instructor and in collaboration with the student's academic advisor. Senior projects are typically initiated in the Fall. The project results must also be presented in DSCI-499C.

Terms Typically Offered: Fall.

## DSCI-499C Capstone Seminar in DSCI 2 Credits

This course includes analysis and evaluation of current research in the data sciences and the integration of faith and learning in the data sciences. An oral presentation of research from DSCI 450, 485, or 488 is required. In-class presentations by faculty and guests are a part of the course. This course fulfills the Core Curriculum Capstone requirement for Data Science majors.

Prerequisite: DSCI-450 and DSCI-485

Terms Typically Offered: Spring.