DATA SCIENCE 4+1

4+1 Program Description

A Data Scientist is a professional who combines many types of technical and industry competencies to turn data, which is very often idiosyncratic and ambiguous, into actionable intelligence in a business environment. The skills needed to make this transformation draw from mathematics, statistics, computer science, and business, and require the ability to communicate technical information to people with a range of technical competence. Saint Mary's Master of Science in Data Science program is designed to rapidly bring students to the point of functioning in the role of a data scientist and then, building on the initial growth, to develop expertise with their data science skills.

Data-driven decisions are made across most major industry sectors on a daily basis. This means the work of data scientists can be done by those from an array of backgrounds as long as they have a foundation in the skills listed above, namely, mathematics, statistics, and computer programming. At Saint Mary's students can earn a bachelor's degree, in any area, and the data science master's degree in just five years.

Study Abroad

Saint Mary's has a long history of providing quality international programs as an essential part of our educational mission—forming women leaders who will make a difference in the world. As this world becomes increasingly interdependent, the College offers an expanding range of semester, year, semester break, and summer study and service programs in a wide variety of countries, and encourages students to take advantage of them. Learn more about the various Study Abroad opportunities (https://catalog.saintmarys.edu/undergraduate/academic-life/international-programs/).

Programs

- 4+1 Program in Data Science (https://catalog.saintmarys.edu/undergraduate/programs/data-science/4-1-program-data-science/)

Department Chair

Bogdan Vajiac, Program Director
337 Madeleva Hall
574-284-4717

Data Science Courses

DSCI 500A Essential Calculus for Data Science (1)
This course introduces the concepts from differential, integral, and multivariate calculus essential for the study of data science. Elements of linear algebra, such as vectors, planes, and matrices, also included. Emphasis on computation and application.

DSCI 500B Essential Probability Theory for Data Science (1)
This course introduces concepts from probability theory essential for the study of data science. Topics include probability spaces, Bayes' Theorem, random variables, discrete and continuous distributions, specifically the normal distribution, and the Central Limit Theorem. Emphasis on computation and application.

DSCI 501 Data Mining (3)
This course is about mining knowledge from data in order to gain useful insights and predictions. From theory to practice, the course investigates all stages of the knowledge discovery process, which includes data preprocessing, exploratory data analysis, prediction and discovery through regression and classification, clustering, association analysis, anomaly detection, and postprocessing.

DSCI 502 Data Mining II (3)
A second semester of data mining introducing tools and techniques related to mining large scale data sources. Prerequisite:DSCI 501

DSCI 511 Data Preprocess/Visualization (3)
This course is an introduction to data visualization. It includes data preprocessing and focuses on specific tools and techniques necessary to visualize complex data. Data visualization topics covered include design principles, perception, color, statistical graphs, maps, trees and networks, and other topics as appropriate. Visualization tools may include JavaScript D3 library, Python, and R, and commercially available software such as Tableau, etc. The course introduces the techniques necessary to successfully implement visualization projects using the programming languages studied.

DSCI 525 Research Methods (3)
An introduction to basic scientific and statistical research methods when dealing with measurements of human and corporate activity. Students read and evaluate current research and translate their ideas into viable research projects. Topics include scholarly writing and presentation, descriptive research methods, quasi-experimental and experimental design, ethical issues, and analytical methods.

DSCI 595 Thesis (1-3)
Thesis credit may be earned for significant work toward the writing of a master's thesis. This thesis may be used to fulfill the culminating project requirement.

DSCI 599 Practicum (1-6)
The practicum is an opportunity to directly experience the work of a data scientist or data analytics professional. It consists of project-based learning on a significant and contributory business objective in conjunction with practicing professionals in one of many appropriate industries. May be repeated up to 6 credits.

DSCI 997 Fulltime (12)