

DATA SCIENCE

(Department of Mathematics)

Data Science is an emerging, multi-disciplinary field concerned with the science of drawing valuable insights and predictions from large volumes of data. The curriculum is built on a foundation of computing skills, knowledge of statistical and machine learning models, data visualization, analysis, and communication skills, and an awareness of ethical issues surrounding data. Students will have the opportunity to integrate their knowledge and skills from these areas to solve real-world problems that make use of data.

- Data Science Major (<https://catalog.rmc.edu/programs/data-science/data-science-major/>)
- Data Science Minor (<https://catalog.rmc.edu/programs/data-science/data-science-minor/>)

DATA 110 - Mathematical Foundations of Data Science (3 Hours)

This course provides an introduction to several areas of mathematics which are needed to understand and practice data science. The principal aim throughout is to provide the necessary computational skills to enable you to solve real-world problems involving data. In order to do this, we learn the mathematics underlying many problems in data science, machine learning, and statistical analysis. Topics of study will include basic calculus, vectors and matrices, probability, and inferential statistics. C21: QS,NS.

DATA 210 - Principles of Data Science (3 Hours)

This course is an introduction to the principles and practice of the rapidly growing field of Data Science. Students will learn the skills, tools, and techniques to extract valuable insights and make predictions from data using a high level programming language. They will learn about data manipulation and handling, inferential statistics, data visualization, exploratory data analysis, concepts such as supervised learning (classification and regression), unsupervised learning (clustering), various machine learning models, training vs. testing error, hyper parameter tuning, and ensemble methods and the use of associated software libraries. Real-world examples will be selected from a variety of domains - examples include textual analysis, stock price predictions, document clustering based on similarity, and handwritten digit classification. The course will culminate in a final project.

Prerequisite(s): DATA 110 and CSCI 111

DATA 310 - Communicating with Data (3 Hours)

The course engages students in projects that require the use of data science and analytics methods. Students gain expertise in data science by working on real-life projects from the natural sciences, the social sciences, and the humanities involving complex data. Using no-code or low-code data science and business analytics and visualization tools such as Tableau and KNIME, students learn how to access data from various repositories, explore raw data from different domains and formats, clean the data, perform exploratory data analysis, and apply statistical methods and predictive modeling. The course enables students to make data-driven decisions and communicate results clearly and professionally.

Prerequisite(s): CSCI 106 and MATH 113, or DATA 210