

DATA - DATA SCIENCE AND ANALYTICS

DATA100 Elementary Statistics and Probability (3 Credits)

Simplest tests of statistical hypotheses; applications to before-and-after and matched pair studies. Events, probability, combinations, independence. Binomial probabilities, confidence limits. Random variables, expected values, median, variance. Tests based on ranks. Law of large numbers, normal approximation. Estimates of mean and variance.

Prerequisite: MATH107, MATH113, or MATH115 with a C- or better; or permission of CMNS-Mathematics department; or must have math eligibility of STAT100 or higher and math eligibility is based on the Math Placement Exam or the successful completion of Math 003 with appropriate eligibility.

Cross-listed with: STAT100.

Restriction: Must not have completed MATH111; or must not have completed any STAT course with a prerequisite of MATH141.

Credit Only Granted for: DATA100 or STAT100.

DATA110 Applications of R for Data Science (1 Credit)

Intended to prepare students for subsequent courses requiring computation with R, providing powerful and easy to use tools for statistical data analysis. Covers basics of R and R Studio including file handling, data simulation, graphical displays, vector and function operations, probability distributions, and inferential techniques for data analysis.

Prerequisite: DATA100, STAT100, MATH135, or any 400-level STAT course.

Cross-listed with: STAT110.

Credit Only Granted for: STAT110 or DATA110.

DATA120 Python Programming for Data Science (1 Credit)

An introduction to programming in Python language, using Jupyter Notebooks and Python scripts. Covers variables, conditionals, loops, functions, lists, strings, tuples, sets, dictionaries, files and visualization.

Prerequisite: DATA100, STAT100, MATH135, or any 400-level STAT course.

DATA200 Knowledge in Society: Science, Data and Ethics (3 Credits)

An introduction to the fundamental concepts and principles that govern ethical data collection, analysis, and usage. Students will explore various methods of data collection and gain an understanding of the ethical implications associated with each approach. Key topics include data ownership, data privacy, data anonymity, and data validity, providing students with a solid foundation in ethical data practices.

Prerequisite: DATA100, STAT100, MATH135, or any 400-level STAT course.

DATA250 Discrete Mathematics (4 Credits)

Introduction to basic discrete mathematical and linear algebraic structures and use of these mathematical structures to solve programming problems. Logic, set theory, formal proof methodology, functions, combinatorics, advanced counting techniques, and elements of linear algebra.

Prerequisite: DATA110 or DATA120; and MATH141.

DATA320 Introduction to Data Science (3 Credits)

An introduction to data science i.e., the end-to-end process of going from unstructured, messy data to knowledge and actionable insights. Provides a broad overview of several topics including statistical data analysis, basic data mining and machine learning algorithms, large-scale data management, cloud computing, and information visualization.

Prerequisite: DATA110 or DATA120; and DATA200 and DATA250; or by permission of the DATA Program Director.

Jointly offered with: CMSC320.

Restriction: Must not be a Computer Science major.

Credit Only Granted for: CMSC320 or DATA320.

DATA350 Data Visualization and Presentation (3 Credits)

Introduction to effective and intuitive visual representations of data, including customizing graphics, plotting arrays, statistical graphics, and representing time series.

Prerequisite: DATA100, STAT100, MATH135, or any 400 level STAT course; and DATA110 or DATA120.

DATA400 Applied Probability and Statistics I (3 Credits)

Random variables, standard distributions, moments, law of large numbers and central limit theorem. Sampling methods, estimation of parameters, testing of hypotheses.

Prerequisite: 1 course with a minimum grade of C- from (MATH131, MATH141); or students who have taken courses with comparable content may contact the department.

Cross-listed with: STAT400.

Credit Only Granted for: DATA400, ENEE324, or STAT400.

Additional Information: Not acceptable toward graduate degrees in MATH/STAT/AMSC.