

MAP: Mathematics: Applied Courses

Courses

MAP 2302 Differential Equations

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: [MAC 2313](#)

Introduction to ordinary differential equations; emphasis on linear equations, operator methods, systems of equations. Applications. Meets Gordon Rule Theoretical Mathematics Requirement.

MAP 3905 Directed Study

College of Sci and Engineering, Department of Mathematics & Statistics

1-12 sh (may be repeated indefinitely for credit)

MAP 4341 Partial Differential Equations

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: [MAP 2302](#)

First-order equations, derivation and classification of second-order equations. Solution techniques of boundary value and initial value problems; applications. Offered concurrently with [MAP 5345](#); graduate students will be assigned additional work. Meets Gordon Rule Theoretical Mathematics Requirement.

MAP 5196 Mathematics for Data Science

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

It is a course in linear algebra, vector calculus and probability illustrated on data science applications. While the emphasis will be on the mathematical concepts, a programming platform Matlab will be used for application demonstration.

MAP 5345 Partial Differential Equations

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

First-order equations, derivation and classification of second-order equations. Solution techniques of boundary value and initial value problems; applications. (Gordon Rule Course: Theoretical Math) Offered concurrently with [MAP 4341](#); graduate students will be assigned additional work.

MAP 5471 Advanced Probability and Inferences

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Advanced topics in probability, limit theorems, limiting distributions, order statistics, weak law of large numbers, strong law of large numbers, central limit theorem. Advanced topics in point and interval estimation, measures of quality of estimates, Exponential families, Completeness, Unbiasedness, Cramer-Rao inequality, Rao-Blackwell theorem, minimum variance unbiased estimators, maximum likelihood estimators principles, Bayes' and minimax estimation, Robust estimation; Advanced hypothesis testing.

MAP 5905 Directed Study

College of Sci and Engineering, Department of Mathematics & Statistics

1-12 sh (may be repeated indefinitely for credit)

MAP 6106 Mathematical Methods of Operations Research I

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Mathematical linear programming models, theory of simplex method, revised simplex methods, dual simplex methods; duality theory and sensitivity analysis, transportation problems, theory of integer programming. Credit may not be received for both [MAP 6106](#) and STA 6607.

MAP 6107 Mathematical Methods of Operations Research II

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Interior-point algorithm, linear goal programming, game theory, nonlinear programming, network analysis, PERT / CPM, queuing theory. Credit may not be received in both [MAP 6107](#) and STA 6608.

MAP 6108 Mathematical Modeling and Initial and Boundary Value Problems

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Methodology and framework for mathematical modeling. Current topics in applied mathematics will be presented emphasizing the interdependency of mathematics and its applications to physical, societal and other "real world" phenomena.

MAP 6114 Machine Learning

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Machine learning uses interdisciplinary techniques such as statistics, linear algebra, optimization and computer science to create automated systems that can shift through large volumes of data at high speed to make predictions or decisions without human intervention. MAS3105 and the ability to program algorithms in a language of Matlab or Python are required before taking the course.

MAP 6377 Numerical Analysis of Partial Differential Equations

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

Prerequisite: [MAD 6405](#)

This course provides a basic foundation in numerical methods for solving partial differential equations.

MAP 6905 Directed Study

College of Sci and Engineering, Department of Mathematics & Statistics

1-12 sh (may be repeated indefinitely for credit)

MAP 6930 Topics in Applied Mathematics

College of Sci and Engineering, Department of Mathematics & Statistics

3 sh (may not be repeated for credit)

This course is devoted to applications chosen from among Numerical Analysis, Numerical Linear Algebra, Ordinary and Partial Differential Equations, Optimization, Mathematical Modeling, and Mathematical Visualization.