

MATHEMATICS APPLIED (MAP)

MAP 2302 - Differential Equations (3 Credits)

An introduction to differential equations and their applications, based upon a knowledge of calculus. Topics to include: initial value problems of the first-order, numerical solutions, systems of differential equations, linear differential equations, Laplace transforms, series solutions.

Prerequisite(s): MAC 2312

Attribute(s): GRMT - Computation Skills

MAP 3161 - Math for Science & Engineering (4 Credits)

Emphasis on applications in a multivariate context. Core topics are vector calculus and systems of differential equations. Optional topics may include tensor analysis, calculus of variations, series and transform methods for ODEs, and Sturm-Liouville theory.

Prerequisite(s): MAS 3105 and MAP 2302

Attribute(s): GRMT - Computation Skills, SUSC - Sustainability Component

MAP 3162 - Probability & Statistics (4 Credits)

Introduction to mathematical statistics covering the main ideas and key theorems. Topics include enumeration, axiomatic development of probability theory, random variables, differential and cumulative probability distributions, moment generating functions, transformations of random variables, approximations to the binomial distribution, the Central Limit Theorem, hypothesis testing, point and interval estimation, and regression analysis.

Prerequisite(s): MAC 2313

Attribute(s): GRMT - Computation Skills, SUSC - Sustainability Component

MAP 3163 - Operations Research I (3 Credits)

Introduction to mathematical aspects of decision science and operations research. Topics include systems of inequalities and linear programming, simplex algorithm, sensitivity analysis, integer programming, branch and bound methods, graph and network models, shortest paths, matchings, network flows, duality theory, introduction to game theory.

Prerequisite(s): MAS 3105

Attribute(s): GRMT - Computation Skills, SUSC - Sustainability Component

MAP 4314 - Dynamical Systems (3 Credits)

Topics include discrete dynamical systems: fixed points and stability, bifurcations, classification of equilibria, self-similarity, fractals. Continuous dynamical systems: kneading, bifurcations, attractors, limit cycles and their classification, chaotic behavior.

Prerequisite(s): MAS 3105 and MAP 2302

Attribute(s): GRMT - Computation Skills

MAP 4341 - Partial Differential Equations (3 Credits)

Elements of the classical theory of partial differential equations. Topics include classification of PDEs and boundary value problems, Fourier series and transform, separation of variables, Fourier series solution of wave and heat equations, d'Alembert's solution and change of variables, transform methods, applications.

Prerequisite(s): MAC 2313 and MAP 2302

Attribute(s): GRMT - Computation Skills

MAP 5316 - Differential Equations I (3 Credits)

This course surveys elementary methods and then focuses on advanced techniques for solving ordinary differential equations, including the method of Frobenius, and Sturm-Liouville theory.

Attribute(s): GRMT - Computation Skills

MAP 5489 - Mathematical Biology (3 Credits)

Introduction to continuous and discrete mathematical models for biological and public health phenomena. Applications are taken from ecology, epidemiology, and/or physiology. Includes techniques for modeling single species and interacting population dynamics, infectious disease transmission, and molecular interactions. Analytical and numerical tools will be used to analyze and interpret models and visualize their solutions.

MAP 6436 - Topics in Applied Mathematics (3 Credits)

Advanced mathematical methods for engineering and scientific applications. Topics include calculus of variations, Laplace transforms, Fourier transforms, vector and tensor methods.

Attribute(s): GRMT - Computation Skills