

264. Differential Equations

An introductory course in ordinary differential equations including techniques of elementary linear algebra. Emphasis is on first-order equations, and higher-order linear equations and systems of equations. Topics include qualitative analysis of differential equations, analytical and numerical solutions, Laplace transforms, existence and uniqueness of solutions, and elemental models in science and engineering. Prerequisite: Mathematics 263. **Akinyemi/Corvino**

272. Linear Algebra with Applications

An introductory course in linear algebra emphasizing applications to fields such as economics, natural sciences, computer science, statistics, and engineering. The course covers solutions of systems of equations, matrix algebra, vector spaces, linear transformations, determinants, eigenvalues, and eigenvectors. Corequisite: Mathematics 263 or permission of instructor. **Dougherty/Mancuso**

282. Techniques of Mathematical Modeling

A course that introduces students to the fundamentals of mathematical modeling through the formulation, analysis, and testing of mathematical models in a variety of areas. Modeling techniques covered include proportionality, curve fitting, elementary linear programming, and simulation. Prerequisite: Mathematics 162. **Lewis**

286. Intro to Probability & Mathematical Statistics

This course will serve as a one-semester introduction to probability and mathematical statistics, with roughly half of the semester devoted to each. After learning basics of set theory and axiomatic probability, we review random variables, probability mass/density functions, expected value (including covariance and correlation), and expected value and variance of linear combinations. Then we begin inferential statistics (confidence intervals and hypothesis tests), correlation and simple linear regression, and, time permitting, one-way analysis of variance and/or chi-squared tests. Prerequisite: Math 263. **Lewis**

290. Transition to Theoretical Math

An introduction to the concepts and techniques that permeate advanced mathematics. Topics include set theory, propositional logic, proof techniques, relations, and functions. Special emphasis on developing students' facility for reading and writing mathematical proofs. Examples and additional topics are included from various branches of mathematics, at the discretion of the instructor. Corequisite: Mathematics 263 or permission of instructor. **Zulli**

300. Vector Spaces

A first course in theoretical linear algebra, emphasizing the reading and writing of proofs. Topics include systems of linear equations, matrix algebra, vector spaces and linear transformations, eigenvectors and diagonalization, inner product spaces, and the Spectral Theorem. Not open to students with credit for Mathematics 272. Prerequisite: Mathematics 290 or permission of instructor. **Chepuri**

306. Operations Research

A study of some mathematical methods of decision making. Topics include: linear programming (maximizing linear functions subject to linear constraints), the simplex algorithm for solving linear programming problems, sensitivity analysis, networks and inventory problems and applications. Prerequisite: Mathematics 272 or Mathematics 300 or permission of instructor. **Bloom**

312. Partial Differential Equations

An introduction to partial differential equations and their applications. Formulation of initial and boundary value problems for these equations and methods for their solution are emphasized. Separation of variables and Fourier analysis are developed. The course includes interpretation of classical equations and their solutions in terms of applications. Prerequisite: Math 263. **Abedin**

328. Number Theory

An introduction to the theory of the integers and techniques for their study and application. Topics include primality, modular arithmetic, arithmetic functions, quadratic residues, and diophantine equations. Prerequisite: Math 263 or permission of instructor; reading and writing proofs will be a significant part of the course, so Math 290 could be useful, though it is not a prerequisite. **Grodzicki**

335. Probability

A development of basic probability theory including the axioms, random variables, expected value, the law of large numbers, and the central limit theorem. Additional topics include distribution functions and generating functions. Prerequisite: Math 263. **Lu**

336. Mathematical Statistics

A mathematical development of fundamental results and techniques in statistics. Topics include estimation, sampling distributions, hypothesis testing, correlation and regression. Prerequisite: Math 335. **Gaugler**

356. Intro to Real Analysis

A rigorous development of the calculus of functions of one real variable including the topology of the real line, limits, uniform convergence, continuity, differentiation and integration. [W] Prerequisite: Mathematics 290. **Fisher/Root**

375. Special Topic: Computational Statistics

This course provides an option for students seeking an exposure to more specialized topics in statistics. Computational statistics is an area within statistics that encompasses computational and graphical approaches to solving statistical problems. Students will be introduced to technologies that are useful for statistical computing. Prerequisites: Students are expected to have successfully completed Math 336 (Mathematical Statistics) and either Math 272 (Linear Algebra with Applications) or Math 300 (Vector Spaces). Students are also expected to use techniques covered in the calculus sequence. **Xu**

379. Special Topic: Visualization, Fractals & Chaos

This course explores the visualization of mathematical objects and algorithms using computer graphics and the programming language J which will be introduced as needed. The topics include fractals, chaos, fractal dimension, iterated function systems, finite automata, fuzzy logic, image processing, complex dynamics, frieze, crystalline and hyperbolic symmetry, and chaotic attractors. Three-dimensional representations will be projected to two dimensions, ray-traced and animated. Prerequisite: Math 272 or Math 300 (Math 300 can be taken at the same time) or permission of the instructor. **Reiter**

400. Senior Seminar

A course in which each student undertakes a thorough and independent study of one or more topics in mathematics. Students are required to make oral presentations on their work and to prepare written reports on their topics. [W] Prerequisite: Senior standing and satisfactory completion of at least two 300-level courses in mathematics. **Berkove**

Anticipated Courses for Fall 2023:**264 Differential Equations****272 Linear Algebra with Applications****287 Intro to Data Modeling****290 Transition to Theoretical Mathematics****301 Case Studies in Mathematical Modeling****325 Combinatorics****335 Probability****336 Mathematical Statistics****338 Advanced Regression Analysis****343 Advanced Multivariable Calculus****351 Abstract Algebra I****357 Real Analysis II****3XX Special Topics - TBD**