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] **Corvino**

Special Topics for Spring 2018:

Math 370. Combinatorial Game Theory
Combinatorial game theory is the study of 2-player games that involve no chance, with each player having perfect information on his or her turn. Topics covered in this course include the theory of game trees, sums of games, nimbers, the Sprague-Grundy theorem, and thermographs. These ideas will be applied to the analyses of games such as Go, Hackenbush, Chomp,Snort, Cutcake, and Domineering. Prerequisite: Math 290, or permission of the instructor. ***Smith***

Math 376. Set Theory
Set theory provides a foundation for modern theoretical mathematics. We will discuss how to build the real number system from the axioms of set theory. Fundamental to the discussion will be the notions of cardinals and ordinals, and the role of the Axiom of Choice.
Corvino

Anticipated Courses for Fall 2018:

264 Differential Equations
272 Linear Algebra with Applications
290 Transition to Theoretical Mathematics
301 Case Studies in Mathematical Modeling
323 Geometry
335 Probability
336 Mathematical Statistics
345 Complex Analysis
347 Financial Mathematics
351 Abstract Algebra I
358 Topology

Special Topics Courses anticipated for Fall 2018:

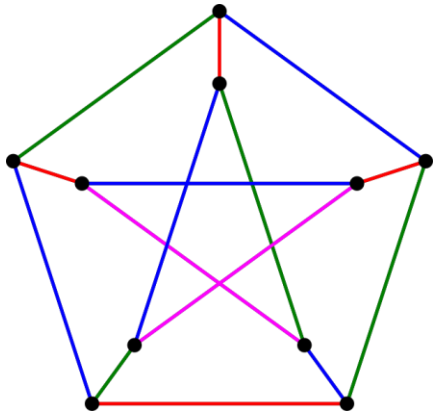
TBD

Recommendation: ***Majors should take both Mathematics 290 and 300 by the end of the second year to permit the widest possible selection of courses in the third and fourth years.***

Visit http://math.lafayette.edu/ for updates on these and other courses anticipated for next academic year.

Special & Advanced Mathematics Courses

Spring 2018



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.
Ndangali, Yuster, Zhou

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. **Zulli**

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 or 166. **Zhou**

286. Intro to Probability & Math 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. **Root**

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.
Bloom

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. **Traldi**

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 300 or permission of instructor. **Bloom**

310. Ordinary Differential Equations
A course in the theory and applications of ordinary differential equations which emphasizes qualitative aspects of the subject. Topics include analytic and numerical solution techniques for systems of equations, graphical analysis, stability, existence-uniqueness theorems, and applications.
Prerequisite: Mathematics 263 and 272 or 300.
Hill

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.
Hammarsten C., Fisher

336. Mathematical Statistics
A mathematical development of fundamental results and techniques in statistics. Topics include estimation, sampling distributions, hypothesis testing, correlation and regression. Offered: Spring semester.
Prerequisite: Mathematics 335. **Liebner**

352. Abstract Algebra II
Topics may include extension fields, geometric constructions, algebraic coding theory, and algebraic number theory.
Prerequisite: Mathematics 351 and a corequisite of 300 or permission of instructor. **McMahon**

356. Introduction to Real Analysis
A rigorous development of the calculus of functions of one real variable including the topology of the real line, limits, continuity, differentiation and integration.
Prerequisite: Mathematics 290. **Kimber**

360. History of Mathematics (W)
Mathematics is a living, changing subject whose truths, once identified, have remarkable staying power. In this course, students analyze various episodes in the history of mathematics that illustrate how mathematical knowledge has developed over the years. Topics include: Egyptian and Babylonian mathematics; indigenous mathematics from outside of the Western tradition; the contributions of Euclid and Ancient Greek mathematics; the birth of calculus; and selected topics from the nineteenth and twentieth centuries.
Prerequisite: Mathematics 263 or permission of instructor. **Hill**