

Mathematics

Mathematics

Major Program Requirements

Bachelor of Arts in Mathematics (33 hours of Mathematics and 3 hours of cognates)

Mathematics B.A. Core (21 hours)

MATH 135, 205, 215	Calculus I, II, III (4, 4, 4)
MATH 303	Linear Algebra and Matrices (3)
MATH 313	Abstract Algebra (3)
MATH 403	Number Theory (3)
or MATH 405	Real Analysis (3)

Mathematics B.A. Electives (12 hours)

12 hours of mathematics classes numbered above 215

Mathematics B.A. Cognate (3 hours)

CIS 106	Computer Programming (3)
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Bachelor of Arts with Teacher Certification in Mathematics. See the Teacher Education section of the catalog, p. 237.

Minor Program Requirements

For students majoring in other academic disciplines, a mathematics minor can enhance prospects for graduate or professional studies and increase employment opportunities. The minor requires 20 semester hours in the department, including Mathematics 135, 205, 303 and 9 semester hours of electives from mathematics courses numbered 215 or higher. Mathematics minors must also complete Computer Information Systems 106.

The highly sequential nature of the mathematics curriculum makes it essential that prerequisite mathematical knowledge and skills be mastered prior to enrollment in any mathematics course. A student's score on the Mathematics Placement Examination (given during freshman orientation and available at other times in the Academic Services Office) is critical in the selection of freshman courses. A grade of C- or better is required for fulfillment of all prerequisite courses.

Each mathematics major must have an assigned faculty member from within the department as an advisor for his or her mathematics program.

The semesters listed after course descriptions indicate when courses are expected to be offered. Schedules are subject to change; students should confirm semester offerings with the department when planning degree programs.

Mathematics

Introductory Courses

- 099. Developmental Mathematics (3).** Topics include the real number system, basic operations, fractions, signed numbers, factoring, exponents, roots, decimals, percent and proportion, topics from plane geometry and an introduction to algebra. Emphasis is on development of arithmetic skills and mastery of basic algebraic concepts. Use of the mathematics laboratory is required. College credit only; hours will not count toward graduation requirements. (Prerequisite: Mathematics Placement Examination.) (Must be repeated if grade earned is NC, D or F.) Fall, spring.
- 100. Mathematics for the Liberal Arts (MATHEMATICS BASIC SKILLS) (4).** Covers the following topics: problem solving; sets; logic (truth tables and symbols); probability (counting techniques and expected value); statistics (measure of central tendency and normal curve); consumer mathematics (percentage, interest, installment buying and annuities); primes, composites, LCM and GCD; and graphing linear equations. **Does not satisfy the prerequisite for further mathematics courses.** (Prerequisite: Mathematics 099 or Mathematics Placement Examination.) Spring.
- 101. Intermediate Algebra (MATHEMATICS BASIC SKILLS) (4).** Fundamental operations with algebraic expressions, linear and quadratic equations, graphs, systems of equations, applications and functions. (Prerequisite: Mathematics 099 or Mathematics Placement Examination.) Fall, spring.
- 103. Fundamentals of Modern Mathematics I (3).** An introduction to problem solving, logic, set theory, number systems, operations, number theory and algorithms. (Prerequisite: Mathematics 101 or Mathematics Placement Examination.) Fall.
- 113. Fundamentals of Modern Mathematics II (3).** An introduction to probability and statistics, geometry, measurement and the use of mathematical methods, tools, and technology. (Prerequisite: Mathematics 103.) Spring.
- 115. Pre-Calculus Mathematics (4).** An introduction to the theory of functions related to exponential, logarithmic, rational, polynomial and trigonometric functions. Theorems on rational and complex zeros of polynomials and systems of linear equations. (Prerequisite: Mathematics 101 or Mathematics Placement Examination.) Fall, spring.

Analysis

- 135, 205, 215. Calculus and Analytic Geometry (4, 4, 4).** Topics in analytic geometry, limits, continuity, differentiation, integration, polar coordinates and curves, transcendental functions, parametric equations and functions in parametric form, vectors and vector functions, infinite series, partial derivatives, multiple integrals and applications. (Prerequisite for 135: Mathematics 115 or Mathematics Placement Examination; Prerequisite for 205: Mathematics 135; Prerequisite for 215: Mathematics 205.) Mathematics 135 and 205 offered fall, spring; Mathematics 215 offered spring only.

Mathematics

- 305. Differential Equations (3).** Solutions of various types of ordinary differential equations, linear equations with constant coefficients, Laplace Transform, systems of equations and series solutions. (Prerequisite: Mathematics 205.) Spring '07.
- 405. Real Analysis (3).** Theory of functions of a real variable; sequences and series, limits, continuity, derivatives, the Riemann integral and other topics. Students will be required to research a mathematical topic approved by the instructor, with a formal presentation to be given to members of the mathematics department and the campus community. (Prerequisites: Mathematics 215 and 313.) Fall '06.

Applied Mathematics

- 104. Finite Mathematics (3).** An introduction to systems of linear equations, matrix theory, linear programming, set theory, logic, probability, and other topics. (Prerequisite: Mathematics 101 or Mathematics Placement Exam.) Fall, spring.
- 204. Elementary Statistics (3).** An introduction to the basic principles of statistics, computation of statistics, probability distributions, estimation, confidence intervals, hypothesis testing, and correlation and regression. (Prerequisites: Mathematics 104 or 115 or Mathematics Placement Examination.) Fall, spring.
- 216. Discrete Mathematics (3).** An introduction to Boolean algebra, combinatorics, graph theory, recursion, set theory and trees. (Prerequisite: Mathematics 135.) Spring '07.
- 304. Theory of Probability (3).** Descriptive statistics, probability and counting techniques, discrete and continuous distributions, moment generating functions, multivariate and conditional distributions, the correlation coefficient and least squares regression. (Prerequisite: Mathematics 205) Fall.
- 314. Theory of Mathematical Statistics (3).** Sampling theory, point and interval estimation, order statistics, tests of hypothesis, nonparametric methods, statistical quality control and experimental design. (Prerequisite: Mathematics 304) Spring '08.

Foundations

- 303. Linear Algebra and Matrices (3).** Matrices, determinants, systems of linear equations, vector spaces, linear transformations, eigenvectors and eigenvalues. (Prerequisite: Mathematics 205.) Fall.
- 313. Abstract Algebra (3).** An introduction to the theory of groups, rings and fields. (Prerequisite: Mathematics 303.) Spring.

Modern Languages and Cultures

- 323. Geometry (3).** A survey of topics in geometry including historical topics, elements of logic, foundations in Euclidian geometry and introduction to non-Euclidian geometry using the hyperbolic model. This course emphasizes different methods of proof. (Prerequisite: Mathematics 205.) Spring '08.
- 403. Number Theory (3).** Divisibility, primes, congruences, multiplicative functions, primitive roots, quadratic residues, quadratic reciprocity and other topics. Students will be required to research a mathematical topic approved by the instructor, with a formal presentation to be given to members of the mathematics department and the campus community. (Prerequisite: Math 313) Fall '07.

Special and Advanced Courses

- 199. Exploratory Internship (1-3).**
- 299. Experimental Course (1-3).**
- 309. Topics in Mathematics (1-3).** Topics of interest to faculty and students. Sample topics include, but are not limited to, numerical analysis, graph theory, advanced discrete math, advanced multivariable calculus, partial differential equations, history of mathematics. May be repeated for credit if the topic is different. Offered as needed.
- 399. Professional Internship (1-12).**
- 410. Advanced Topics in Mathematics (1-3).** Advanced topics of interest to faculty and students. Sample topics include, but are not limited to, complex analysis, topology, operations research, advanced topics in linear algebra, abstract algebra, geometry and statistics. May be repeated for credit if the topic is different. Offered as needed.
- 451. Independent Study (1-3).** Advanced topics for students planning further study in mathematics. (Prerequisites: B average in mathematics and department chairperson's written permission.)
- 499. Advanced Experimental Course (1-3).**

Modern Languages and Cultures

The Department of Modern Languages and Cultures offers the **Bachelor of Arts** degree with majors in French, German and Spanish. Students may minor in French, German, Spanish and Japanese. The basic skills requirement in language is met for students who place