

MATHEMATICS (MTH)

MTH-170: Concepts in Mathematics (3 Credits)

This course stresses the breadth of mathematics continuous and discrete, probabilistic as well as deterministic, computational and conceptual while providing students with tools needed to investigate, explore and understand the thematic connections that exist between discipline-based courses. Students investigate appropriate mathematical subject matter drawn from areas such as graphs and networks, the concept of change, combinatorics and probability, modern algebra and number theory. In addition to considering mathematical concepts that are the foundations of these areas in mathematics, students investigate applications of mathematics.

Fulfills Core Requirement in Mathematics.

MTH-171: Mathematics in Social Sciences (3 Credits)

Students study some of the great achievements and concepts in the discipline of mathematics. This course stresses the breadth and application of mathematics in the context of the social sciences while providing students with tools needed to investigate, explore and understand the thematic connections that exist between discipline-based courses. Students employ appropriate mathematical concepts to investigate questions related to such issues as voting systems, apportionment of representation and fair division of resources. In addition to considering mathematical concepts that are the foundation of these areas, students investigate applications of this mathematics.

Fulfills Core Requirement in Mathematics.

MTH-172: Quantitative Methods for Business (3 Credits)

Students study some of the great achievements and concepts in the discipline of mathematics along with their use in the analysis and solution of business problems. Students study the mathematics of finance, decision analysis, project management, and demand forecasting. Students study and apply the mathematical concepts related to expected value decision making and linear programming. Students also study exponential, trend adjusted, and seasonal forecasting as well as quantitative financial concepts such as interest, discounts, annuities, and present value analysis.

Fulfills Core Requirement in Mathematics.

MTH-173: Discrete Mathematics (3 Credits)

This is a course in the foundations of mathematical ideas that underlie the science of computing. The topics that are explored are logical operations, relations and arguments, mathematical induction and recursion, set relations and operations, combinatorics, elementary graph theory, algorithms and computation, and number theory with applications to cryptography.

Fulfills Core Requirement in Mathematics.

MTH-191: Applied Calculus (3 Credits)

Students study topics that include functions, models, and average rate of change, limits, instantaneous rates of change, the derivative, differentiation techniques, applications of the derivative, and a brief introduction to integration. High school algebra II is required.

Fulfills Core Requirement in Mathematics.

MTH-195: Calculus I (4 Credits)

This course covers the following topics: limits and continuity, the derivative, finding and interpreting the derivative, graphing and optimization, integrals of a function of one variable, the fundamental theorem of calculus, integration by parts. The level and pace of this course are generally greater than those of the Applied Calculus course (MTH-191), and some proofs of important theorems are studied. High school precalculus or equivalent is required.

Fulfills Core Requirement in Mathematics.

MTH-196: Calculus II (4 Credits)

Pre-requisite(s): MTH-195 or equivalent, or MTH-191 with consent of instructor is required.

This course covers the following topics: techniques and applications of integration, infinite series, parametric equations and polar coordinates, vectors and the geometry of space, functions of several variables, and partial derivatives. Some proofs of important theorems are studied.

Fulfills Core Requirement in Mathematics.

MTH-203: Calculus III (4 Credits)

Pre-requisite(s): MTH-196 or equivalent is required.

This course covers the following topics: applications of partial derivatives, multiple integrals, vector fields, divergence and curl of a vector field, line and surface integrals, Green's Theorem, Divergence Theorem and Stokes' Theorem and their applications. Some proofs of important theorems are studied.

Fulfills Core Requirement in Mathematics.

MTH-211: Linear Algebra (3 Credits)

Pre-requisite(s): MTH-196 or equivalent is required.

This course covers the following topics: matrix algebra, systems of linear equations, vector spaces, linear transformations, eigenvalues, eigenvectors and applications. Historical notes are included throughout the course.

Fulfills Core Requirement in Mathematics.

MTH-213: Differential Equations (3 Credits)

Pre-requisite(s): MTH-196 or equivalent, and MTH-211 or consent of instructor is required.

This course covers the following topics: first-order ordinary differential equations, higher-order linear differential equations, stability and phase plane analysis, Laplace transformations, series solutions, numerical methods, and applications. Historical notes are included throughout the course.

MTH-315: Geometry (3 Credits)

Pre-requisite(s): MTH-196 or consent of instructor is required.

Students study concepts of geometry. In particular, students study Euclidean and non-Euclidean geometries. Historical notes are included throughout the course.

MTH-399: Special Topics (1-3 Credits)

The purpose of this course is to provide an opportunity for students to investigate topics not covered in ordinary course work. The subject matter varies to suit the students and the interests of the professor.

MTH-411: Analysis I (3 Credits)

Pre-requisite(s): MTH-173 and MTH-203 are required.

Topics are chosen from functions of one and several variables, differentiation and Riemann integration, and sequences and series of numbers. Historical notes are included throughout the course.

MTH-412: Analysis II (3 Credits)

Pre-requisite(s): MTH-411 is required.

Topics are chosen from metric and normed spaces, sequences and series of functions, and complex variables. Historical notes are included throughout the course.

MTH-421: Abstract Algebra (3 Credits)

Pre-requisite(s): MTH-173 and MTH-211 are required.

In this course students study groups, rings and fields. Topics in number theory are also explored and historical notes are included throughout the course.

MTH-490: Senior Seminar Capstone (3 Credits)

This course serves as an integrative capstone for the major and the core. Students participate in a weekly seminar on topics in mathematics that build upon and extend beyond the material covered in our regular courses. Each student develops a proposal for an in-depth study of a particular topic of interest. Students will give a presentation of their topic in the seminar during the final weeks of the semester and a final written report will be submitted to the department faculty. This seminar serves as an integrative capstone linking enduring questions and interdisciplinary knowledge from the Core Curriculum to students' majors.

MTH-491: Internship (1-3 Credits)

Experiential course that provides students with practical work experience while acquiring or applying knowledge in one or more areas of mathematical sciences.

MTH-499: Independent Study (1-3 Credits)

Supervised study of a particular area of mathematical sciences not available in a regularly scheduled course.