

MATHEMATICS (MTH)

Courses and Descriptions

MTH 100 Intermediate Algebra 3 Credits

This course prepares science and mathematics majors for college level mathematics courses. Topics include linear and absolute value equations and inequalities, quadratic and polynomial functions and their graphs, rational and radical equations, and systems of linear equations. This course does not fulfill the mathematical reasoning requirement of the CLAS general education curriculum.

MTH 102 Finite Mathematics 3 Credits

This mathematically rigorous course begins with a review of the rational numbers, repeating decimals, irrational numbers and non-repeating decimals. The elementary theory of sets is discussed with applications to surveys and data mining. This is followed by a discussion of the cardinality of infinite sets. An introduction to elementary number theory includes various applications. The Cartesian plane and the idea of a function and its graph are introduced with applications. Counting theory then precedes an elementary discussion of probability.

MTH 105 Algebra and Trigonometry 4 Credits

The course is an in depth and rigorous study of functions and graphs, equations and inequalities, polynomial and rational functions, exponential, and logarithmic functions, basic trigonometric functions and their inverses, trigonometric identities.

Prerequisite(s): A mathematics SAT score of 570, departmental placement or MTH 100 with a grade of C or higher.

MTH 106 Precalculus 4 Credits

The course is an in depth and rigorous study of the Cartesian plane, functions and graphs, equations and inequalities, polynomial and rational functions, exponential, and logarithmic functions, basic trigonometric functions and their inverses and trigonometric identities. The course is characterized by an emphasis on establishing firm mathematical foundations for the topics presented. The ideas discussed will be accompanied with mathematical proofs wherever it is feasible so to do. The course is designed to accord with the level of material in MTH 210 Calculus I. Credit will not be granted for both MTH 105 and MTH 106.

Prerequisite(s): A mathematics SAT score of 570, departmental placement or MTH 100 with a grade of C or higher.

MTH 120 Introduction to Applied Statistics 3 Credits

Collection and presentation of data. Measures of location and variation, sampling theory, hypothesis testing, confidence intervals, t-tests, chi-square tests, regression, and correlation. Emphasizes practical applications. Not open to business administration, chemistry, environmental, geosciences, marine sciences, math or liberal studies: marine ecological or environmental emphasis majors.

Prerequisite(s): MTH 102 or MTH 105.

MTH 150 Mathematics for Education Majors I 3 Credits

This is the first course in a three-course sequence for education majors. This course covers the concept of Numbers, starting with counting numbers, decimals, negative numbers, fractions, and real numbers; different ways of representing numbers, and the relations between them are explored; different meanings and applications of the arithmetic operations are studied; standard and non-standard algorithms for arithmetic are considered in light of the representation of numbers. May not be used by CLAS students to satisfy the mathematics component of the core.

MTH 151 Mathematics for Education Majors II 3 Credits

This is the second course in a three-course sequence for elementary education majors. In this course, students will study proportional reasoning, Number Theory, Algebra, Geometry, and measurement. May not be used by SLAS students to satisfy the mathematics component of the core.

Prerequisite(s): MTH 150.

MTH 152 Mathematics for Education Majors III 3 Credits

This is the third course in a three-course sequence for elementary education majors. In this course, students will study area and volume, transformational geometry, statistics and probability.

Prerequisite(s): MTH 151.

MTH 210 Calculus I 4 Credits

Introduces analytic geometry, functions, limits, and derivatives; differentiation of algebraic and trigonometric functions, curve sketching, maxima and minima, and higher derivatives.

Prerequisite(s): Math SAT 650 or higher or Math ACT score of 28 or higher or MTH 105 or MTH 106 with a grade of C or higher.

MTH 211 Calculus II 4 Credits

The definite integral, differentiation of transcendental functions, methods of integration and approximate integration, determination of area, volume, and surface area.

Prerequisite(s): MTH 210 with a grade of C or higher.

MTH 212 Calculus III 4 Credits

Infinite series; functions of two and three variables, vectors and tangent planes, partial derivatives, multiple integrals, determination of volume and density.

Prerequisite(s): MTH 211 with a grade of C or higher.

MTH 230 Discrete Mathematics 4 Credits

An introduction to topics in Discrete Mathematics. This course covers methods of proof, induction and recursion, and other topics in discrete mathematics. Topics may include graph theory, trees, and symmetry groups.

Prerequisite(s): MTH 102, MTH 105 or MTH 210.

MTH 240 Linear Algebra 3 Credits

Systems of linear equations; vector spaces; linear independence; determinants; orthogonality; linear maps; eigenvectors.

Prerequisite(s): MTH 210 or as corequisite; sophomore standing; or permission of instructor.

MTH 250 Differential Equations 3 Credits

First order differential equations, separable and exact; integrating factors; second order linear differential equations; series solutions of second order linear differential equations; higher order equations; existence and uniqueness theorems; systems of linear differential equations.

Prerequisite(s): MTH 240, MTH 211.

Corequisite(s): MTH 212 or as prerequisite.

MTH 308 Advanced Calculus 3 Credits

Vectors, gradients, and directional derivatives, Lagrange multipliers, Taylor's theorem, multiple integrals, change of variables, line and surface integrals, Stokes' theorem.

Prerequisite(s): "B" average in MTH 210 and MTH 211; MTH 212, MTH 240.

MTH 315 Modern Geometry 3 Credits

Covers geometry from a modern point of view, with emphasis on non-Euclidean geometry, particularly projective geometry.

Prerequisite(s): MTH 211, MTH 240.

MTH 340 Probability & Statistical Analysis I 3 Credits

Theory of sets and probability; discrete and continuous random variables and probability distributions. Emphasizes foundations and utilizes the techniques of the calculus.

Prerequisite(s): MTH 212 or MSD 111.

MTH 341 Probability & Statistical Analysis II 3 Credits

Continuation of MTH 340. Foundations of mathematical statistics: normal distributions, estimation, confidence intervals and hypothesis testing; topics chosen from student's t-test, chi-square tests, analysis of variance and regression analysis. Emphasizes foundations and utilizes the techniques of the calculus.

Prerequisite: MTH 340. Spring.

MTH 401 Modern Algebra 3 Credits

Provides an introduction to modern abstract algebra. It emphasizes the axiomatic method to analyze the major algebraic systems. The instructor will choose the topics to be studied from among the following algebraic structures: integral domains, fields, complete ordered fields, groups, polynomials, rings, ideals and modules.

Prerequisite(s): MTH 240.

MTH 402 Topics in Advanced Mathematics 3 Credits

Chosen from advanced pure or applied mathematics. Topics vary, depending on instructor.

Prerequisite(s): MTH 212 and MTH 240.

MTH 410 Complex Analysis 3 Credits

Analytic functions, conformal mapping, power series, Cauchy's theorem, calculus of residues.

Prerequisite(s): MTH 212 and MTH 240.

MTH 420 Number Theory 3 Credits

Covers topics including divisibility theory, the prime numbers, the theories of congruences and of quadratic reciprocity, and Fermat's Last Theorem. Other topics may also include applications to cryptography, Pell's equations, continued fractions, and the theory of partitions.

Prerequisite(s): MTH 240 or permission of instructor.

MTH 430 Introduction to Topology 3 Credits

A comprehensive introduction to elementary topology. The concepts of topological spaces and metric spaces will be introduced. Connectedness, compactness and properties of subsets of the real numbers rooted in topology will also be considered. The quotient topology will be used to construct surfaces as identification spaces, and tools will be developed to distinguish one surface from another.

Prerequisite(s): MTH 212.

MTH 440 Real Analysis 3 Credits

Covers the theory of sets, the real number system and its properties, convergence of sequences and series of numbers and functions, and the theory of integration, including: measure theory, the Riemann integral, and introduction to the Lebesgue theory of integration.

Prerequisite(s): MTH 212 and MTH 240.

MTH 490 Independent Study: Research and Creative Expression 1-4 Credits

Immerses the student in research and mathematical literature. If possible, the student will publish the results or present them at a scientific meeting.