MATHEMATICS (MTH)

MTH 1101 - Mathematics for Elementary Education Majors I (Foundations : VFMA - Mathematics) - 3 cr.
Examines the concepts and diverse modalities by which students learn patterns and functions, problem-solving, probability, sets, number sense, computational procedures, relationships of integers, properties of real numbers, and number theory. Understanding of multiple problem-solving methods for the concepts covered and understanding the mathematical properties and processes involved is the primary focus of the course.

MTH 1102 - Mathematics for Elementary Education Majors II (Foundations : VFMA - Mathematics) - 3 cr.
Examines the concepts and diverse modalities by which students learn properties and relationships of 2D and 3D geometric figures, measurement, usage of geometric learning tools, data investigations, randomness and uncertainty, and algebraic representation. Understanding of multiple problem-solving methods for the concepts covered and understanding the mathematical properties and processes involved are key focuses of the course.

MTH 1110 - Mathematics in Society and Nature (Foundations : VFMA - Mathematics) - 4 cr.
Covers mathematical topics of use and/or interest to students who do not need a technical course in algebra to succeed in sciences or pre-calculus. Topics cover a broad range, such as the interpretation of graphical information, growth models, a basic introduction to data, probability and statistics, game theory, voting theory, number systems, geometry and fractals, and mathematics in nature.
Prerequisite Courses: three years of high school math or instructor's permission.

MTH 1111 - College Algebra (Foundations : VFMA - Mathematics) - 4 cr.
Topics include a brief review of elementary algebra, introduction to polynomial, exponential, logarithmic and trigonometric functions using both symbolic and graphic approaches. Emphasis is on applications in a variety of disciplines and solutions of real-world problems. Students planning to continue mathematics receive appropriate preparation.
Prerequisite Courses: three years of high school math or instructor's permission.

MTH 1122 - Precalculus (Foundations : VFMA - Mathematics) - 4 cr.
Precalculus mathematics, further properties of polynomial and rational functions, exponential and logarithmic functions, trigonometric functions and their graphs, trigonometric identities and equations, inverse trigonometric functions, introduction to analytic geometry. Formal mathematical language designed to help students succeed in college calculus courses.
Prerequisite Courses: MTH 1111 or Math ACT above 24.

MTH 2221 - Calculus I (Foundations : VFMA - Mathematics) - 4 cr.
Limits, continuity and fundamental theory of differentiation, symbolic and numerical calculations of derivatives, applications of derivatives; definite integrals and Riemann sums.
Prerequisite Courses: MTH 1122, Precalculus or ACT Math score of at least 29.

MTH 2222 - Calculus II (Foundations : VFMA - Mathematics) - 4 cr.
Study of numerical integration, applications of definite integrals, improper integrals, sequences and infinite series, basic ideas and methods for solving differential equations.
Prerequisite Courses: MTH 2221

MTH 2401 - Discrete Mathematics I (Foundations : VFMA - Mathematics) - 4 cr.
Elementary graph theory including matrix representation; coding and sorting applications; combinations and permutations; voting and apportionment; introduction to logic; elementary algorithm analysis and design; mathematical induction.
Prerequisite Courses: MTH 1111, Java Programming language or instructor's permission.

MTH 2442 - Introduction to Data Analysis and Applied Statistics (Foundations : VFMA - Mathematics) - 4 cr.
Covers the fundamentals of data analysis and applied statistics with particular emphasis on the reasoning behind techniques and the entirety of a data focused investigative process. Students will have the opportunity to work with real data, use a statistical programming language, and perform entire analyses on data from asking initial questions to communicating final conclusions. Common statistical topics include inference with resampling methods, inference with probability distributions, and simple linear regression.

MTH 2777 - Topics in Mathematics - 2-4 cr.
Topics.

MTH 3302 - Contemporary Geometry - 4 cr.
Foundations of Euclidean geometry, solid geometry; introductions to non-Euclidean geometry; spherical geometry. Course includes dynamic geometry investigations using appropriate software.
Prerequisite Courses: MTH 2401

MTH 3321 - Multivariable Calculus - 4 cr.
Topics include functions of several variables, gradients, partial derivatives and multiple integrals, vector fields, Green's and Stoke's theorems, and applications.
Prerequisite Courses: MTH 2222

MTH 3322 - Linear Algebra - 4 cr.
Further study of systems of linear equations, matrices and determinants, vector spaces and subspaces, linear transformations, eigenvalues and eigenvectors, diagonalization.
Prerequisite Courses: MTH 2222

MTH 3323 - Differential Equations - 4 cr.
Introduction to the theory of differential equations, varied methods to solve linear, nonlinear equations, quantitative analysis of solutions of equations.
Prerequisite Courses: MTH 2222 and MTH 3321

MTH 3777 - Topics in Mathematics - 0-4 cr.
Topics in Mathematics.

MTH 4332 - Abstract Algebra I - 4 cr.
Introduction to groups, ring and field theory; group homomorphism and isomorphism, Cayley's theorem, and quotient groups, Lagrange's theorem; rings, ideals, ring homomorphism and basic properties of fields.
Prerequisite Courses: MTH 3322

MTH 4411 - Probability and Statistics I   - 4 cr.
A survey course in mathematical probability and statistics. It includes probability distributions and densities, mathematical expectations, functions of random variables, introduction to estimation theory and hypothesis testing and applications.
Prerequisite Courses: MTH 2222

MTH 4421 - Principles of Analysis I   - 4 cr.
Introduction to real analysis. It includes completeness of the real number system, topology of the real line, sequences, convergence, limits, continuity, differentiability and the Riemann integral, the Fundamental Theorem of Calculus.
Prerequisite Courses: MTH 3321 and MTH 3322

MTH 4501 - Senior Seminar I   - 1 cr.
The introduction to a math major's Senior Project. Students will work with their faculty mentor to generate project ideas, develop a project plan, and do background research on their topic.

MTH 4502 - Senior Seminar II   - 1 cr.
The culmination of a math major's Senior Project. Students will finish their project paper and give a 30-minute presentation on their project at the end of the term.

MTH 4555 - Math Internship   - 1-8 cr.
Internship in Mathematics.

MTH 4777 - Topics in Mathematics   - 2-4 cr.
Concentrated study of various subject areas.
Prerequisite Courses: permission of instructor.

MTH 4999 - Independent Study   - 1-4 cr.
Research projects for upper-division students.
Prerequisite Courses: permission of instructor.