

MATHEMATICS (MA)

MA103 Introduction to Statistical Thinking (3 Credits)

A broad introduction to the use and misuse of statistics. Types of variables, descriptive statistics. Tabular and visual display of data. Sampling and polling. Elements of probability. Making inferences from samples. Estimation. Hypothesis testing. Use of computer software to display and analyze data.

Prerequisite(s): Placement.

MA106 Modern Mathematical Concepts II (3 Credits)

Material covered will be selected from the following topics: Algebra-based problem solving, linear and quadratic equations, inequalities, variation, graphs, functions, geometry, measurement, counting methods, statistics, the relation between algebra and geometry.

Prerequisite(s): Placement.

MA109 College Algebra (3 Credits)

An introduction to real-valued functions and their graphs including polynomial, rational, exponential and logarithmic functions; composite and inverse functions; theory of equations; systems of equations and inequalities. A student who has passed MA115 with a grade of C or better may not subsequently receive credit for MA109.

Prerequisite(s): Placement.

MA110 Precalculus (3 Credits)

Plane and analytic geometry—lines, translation of axes; functions and graphs (with and without graphing calculators), translation of graphs, analytic trigonometry, exponential functions, inverse functions (including inverse trigonometric functions and logarithmic functions), absolute value inequalities. A student who has passed MA115 with a grade of C or better may not subsequently receive credit for MA110.

Prerequisite(s): MA109 or placement.

MA115 Calculus I (4 Credits)

Limits and their properties, continuity, derivatives and their applications, integrals, Fundamental Theorem. These will be applied to algebraic, trigonometric, exponential, and logarithmic functions. 5 hours lecture.

Prerequisite(s): MA110 with a grade of C or better; or placement into MA115.

MA116 Calculus II (4 Credits)

Applications of the definite integral, techniques of integration, infinite sequences and series, tests for convergence, Taylor's Theorem, power series. 5 hours lecture.

Prerequisite(s): MA115 with a grade of C or better.

MA209 Linear Algebra (3 Credits)

Vectors, matrices, linear equations, real vector spaces, determinants, linear transformations and matrix representations, Euclidean spaces, eigenvalues and eigenvectors.

Prerequisite(s): MA110 with a grade of C or better; or placement into MA115 or above.

MA210 Discrete Mathematics (3 Credits)

Set theory, mathematical logic, logic networks, mathematical induction; relations and functions; combinatorial analysis; graph theory.

Prerequisite(s): MA110 with a grade of C or better; or placement in MA115 or above.

MA215 Calculus III (4 Credits)

Polar coordinates, vectors and vector-valued functions, surfaces in space, functions of several variables, partial derivatives, gradients, multiple integrals. 5 hours lecture.

Prerequisite(s): MA116 with a grade of C or better.

MA216 Vector Calculus (3 Credits)

Analytic geometry in three dimensions, spherical and cylindrical coordinate systems, vector fields, implicit functions, line and surface integrals, Green's Theorem, divergence theorem, Stokes' Theorem.

Prerequisite(s): MA215 with a grade of C or better.

MA218 Differential Equations (3 Credits)

Differential equations of the first order; linear differential equations of higher order; applications to the physical sciences. Systems of linear differential equations, series solutions; the Laplace transform.

Prerequisite(s): MA116 with a grade of C or better.

MA304 Topics in Mathematics (1 Credits)

A specific topic not offered as a formal course during the given semester.

Prerequisite(s): approval of instructor.

MA311 Introduction to Abstract Algebra I (3 Credits)

An introduction to basic algebraic structures; mappings and operations, permutations, properties of groups, equivalence, congruence, divisibility, direct products and isomorphisms. 4 hours lecture.

Prerequisite(s): Grade of C or better in MA209, MA210, and MA215.

MA312 Introduction to Abstract Algebra II (3 Credits)

More algebraic structures; rings, integral domains, fields, polynomials over a field, quotient groups and rings and homomorphisms. 4 hours lecture.

Prerequisite(s): MA311 with a grade of C or better.

MA321 Foundations of Geometry (3 Credits)

An axiomatic treatment and critique of Euclidean geometry. Hilbert's axioms of connection, order, parallels, congruence and continuity.

Extension of Euclidean geometry to affine and projective geometry.

Prerequisite(s): Grade of C or better in MA209 and MA210.

MA331 Probability & Statistics I (3 Credits)

Basic probability theory in both discrete and continuous sample spaces, random variables and their distribution functions, expectation and variance, covariance and correlation, and the central limit theorem.

Prerequisite(s): Grade of C or better in MA116 and MA210, or permission of department chair.

MA400 Math for Secondary School Teachers (3 Credits)

A capstone course for future secondary school teachers designed to strengthen understanding of secondary school content in the context of the college mathematics curriculum. Emphasis on alternate methods of problem solving, unifying mathematical themes, the historical context of the development of mathematical ideas, the use of technology in teaching mathematics, correct mathematical communication, and methods of making study of mathematics relevant, dynamic and enriching.

Prerequisite(s): MA215, MA311, and MA312.

MA401 Introduction to Analysis (3 Credits)

Real number axioms, sequences, completeness, compactness, continuity, uniform continuity, the derivative, the Riemann integral and sequences of functions. 4 hours lecture.

Prerequisite(s): Grade of C or better in MA209, MA210, and MA215.

MA404 Complex Analysis (3 Credits)

The complex plane and the theory of analytic functions; mapping by elementary functions. Complex integration; series; residues and poles; conformal mapping. Offered on application.

Prerequisite(s): Grade of C or better in MA209, MA210, and MA215; or permission of instructor.

MA414 Research Problem in Mathematics (1 Credits)

Students specializing in mathematics may prepare a research paper with the consent of the department. This may be an historical approach to a known problem, or an original approach to a problem arising from course work. Offered on application.

MA415 Internship/Externship Program (1 Credits)

Students have the opportunity to work in an industrial or advanced academic research atmosphere. Credit will be determined by the length of the experience, with a minimum of 40 hours per credit.

Prerequisite(s): MA215 and junior or senior status.

MA433 Numerical Analysis (3 Credits)

Methods of obtaining numerical solutions to various types of mathematical problems. Numerical solutions of systems of linear and nonlinear equations; interpolation; least squares approximations; numerical differentiation and integration; introduction to numerical methods of differential equations. Programs will be assigned illustrating these methods.

Prerequisite(s): MA116 and CS123; or permission of instructor.