MATHEMATICS (MS)

MS 100 Intermediate Algebra for Precalculus (3)
Operations and properties of real numbers, rates and proportions, units and measurement, elementary plane geometry, linear equations and inequalities, exponents and polynomials, factoring algebraic expressions, graphing in the cartesian plane, systems of equations and inequalities, rational and radical expressions, and functions. Institutional credit only. Grades: A, B, C, NC.

MS 107 Intermediate Algebra for Finite Mathematics (3)
Operations and properties of real numbers, rates and proportions, units and measurement, elementary plane geometry, linear equations and inequalities, exponents, graphs, and radicals. (May not be repeated. Institutional credit only.) Grades: P, NC.

MS 110 Finite Mathematics (3)
Prerequisite(s): Satisfactory score on the departmental placement test, or satisfactory performance in the appropriate developmental course, or MS 112 or higher.
This course gives an overview of topics in finite mathematics with applications, including set theory, logic, proportional reasoning, statistics, and finance. Credit will not be given for both MS 110 and MS 111.

MS 111 Honors Finite Mathematics (3)
Prerequisite(s): Admission to the honors program and at least one of the following
Advanced study of topics in finite mathematics with applications, including set theory, logic, proportional reasoning, statistics, and finance with an emphasis on writing, projects, and technology. Credit will not be given for both MS 110 and MS 111.

MS 112 Precalculus Algebra (3)
Prerequisite(s): Satisfactory score on the departmental placement test, or satisfactory performance in the appropriate developmental course.
First and second degree equations and inequalities; linear and quadratic functions and graphs; polynomial and rational functions; exponential and logarithmic functions; conic sections, and systems of equations.

MS 113 Precalculus Trigonometry (3)
Prerequisite(s): MS 112 with a "C" or better or satisfaction of MCIS Department placement criteria (see the MCIS Department website).
Trigonometric functions and inverses, applications, graphs, identities and equations, laws of sines and cosines, vectors and complex numbers.

MS 114 Mathematical Modeling with Algebra (3)
Prerequisite(s): Satisfactory score on the departmental placement test, or satisfactory performance in the appropriate developmental course.
This course is an introduction to describing and understanding real-world quantitative phenomena algebraically, graphically, numerically, and verbally, with an emphasis on the applications of linear and exponential functions. This course is not intended to supply sufficient algebraic background for students who intend to take MS 120 Calculus and Its Applications, or MS 125 Calculus I.

MS 115 Precalculus Algebra and Trigonometry (4)
Prerequisite(s): MS 112 with a "C" or better or MS 113 with a "C "or better or satisfaction of the MCIS Department placemnt criteria (see the MCIS Department website).
The course is an algebra-trigonometry composite providing the student with a mathematical foundation required for calculus or other courses requiring a similar mathematical background.

MS 120 Calculus and Its Applications (3)
Prerequisite(s): MS 112 with a "C" or better or satisfaction of MCIS Department placement criteria (see the MCIS Department website).
An introduction to the ideas and techniques of the differential and integral calculus, matrix computations, probability theory, and Markov chains. Graphical, numerical, analytical, verbal, and coding representations and analyses of selected applications of these topics relevant to business, industry, management, life, and social sciences. Does not count towards a mathematics major or minor.

MS 125 Calculus I (4)
Prerequisite(s): MS 113 with a "C" or better or MS 115 with a "C" or better or satisfaction of MCIS Departmental placement criteria (see MCIS Department website).
Introduction to analytic geometry, functions and limits, differentiation with applications, indeterminate forms, antiderivatives, definite integrals, numerical integration, calculus of transcendental functions.

MS 126 Calculus II (4)
Prerequisite(s): MS 125 with a "C" or better.
Applications of integration, techniques of integration, improper integrals, infinite series, vectors in the plane and in 3-space.

MS 133 Mathematical Concepts I (3)
Prerequisite(s): MS 112 with a "C" or better.
One of three mathematics courses designed for prospective elementary teachers. Problem solving, set theory, number theory, real number operations, historical development and structure of number systems. (Enrollment by advisement only.)

MS 134 Mathematical Concepts II (3)
Prerequisite(s): MS 133 with a "C" or better.
One of three mathematics courses designed for prospective elementary teachers. A thorough study of geometry, measurement, and statistics. Problem solving and application are emphasized. (Enrollment by advisement only.)

MS 135 Mathematical Concepts III (3)
Prerequisite(s): MS 133 with a "C" or better.
One of three mathematics courses designed for prospective elementary teachers. Logic, probability, principles of counting, algebraic reasoning and representation. (Enrollment by advisement only.)

MS 204 Basic Statistics (3)
Prerequisite(s): Satisfactory score on the departmental placement test, or satisfactory performance in the appropriate developmental course, or MS 110 or higher.
Numerical descriptive methods, axioms of probability, random variables, statistical inference, point and interval estimation of mean, and hypothesis testing.

MS 205 Honors Basic Statistics (3)
Prerequisite(s): Satisfactory score on the departmental placement test, or satisfactory performance in the appropriate developmental course, or MS 110 or higher.
Numerical descriptive methods, axioms of probability, random variables, statistical inference, point and interval estimation of mean, and hypothesis testing. Concepts are reinforced with multiple hands-on experiences throughout the course. A final project serves as a comprehensive evaluation of statistical skills and knowledge.

MS 227 Calculus III (4)
Prerequisite(s): MS 126 with a "C" or better.
Polar coordinates, parametric equations, vector-valued functions, multivariate functions, multiple integrals, vector analysis.

MS 250 Introduction to Linear Algebra (3)
Prerequisite(s): MS 113 or 115.
Basic theory of linear equations, matrices, real vector spaces, bases, dimension, linear transformations, determinants, eigenvalues, eigenvectors, inner product spaces, and the diagonalization of symmetric matrices.

MS 300 Introduction to Advanced Mathematics (WI) (4)
Prerequisite(s): MS 126 with a "C" or better; and EH 102, EH 104, or EH 106.
Mathematical writing, including methods of proof, and fundamentals of sets and functions. May also include selected topics in algebra, analysis, number theory, or discrete mathematics. Students will be required to demonstrate mastery of selected precalculus material by independently completing a mastery-based tutorial and testing program with a satisfactory score. (Writing Intensive Course)

MS 302 Applied Probability and Statistics (3)
Prerequisite(s): MS 120 with a "C" or better or MS 125 with a "C" or better.
Provides a summary of introductory probability and statistics centered around data analysis examples and computer simulations. Includes discrete and continuous probability distributions, estimation, and hypothesis testing.

MS 304 Mathematical Statistics I (3)
Prerequisite(s): MS 126 with a "C" or better.
Probability rules, discrete and continuous random variables and their probability distributions, expected value, variance, moment generating functions, multivariate probability distributions, and covariance.

MS 305 Number Theory (3)
Prerequisite(s): MS 125 with a "C" or better.
An introduction to the principal topics of elementary number theory, including divisibility, linear Diophantine equations, distribution of primes, congruences, Fermat's Theorem, and number theoretic functions.

MS 309 Combinatorics (3)
Prerequisite(s): MS 126 with a "C" or better.
An introduction to counting techniques such as permutations and combinations, the inclusion-exclusion principle, recurrence relations, and generating functions. May also include topics from graph theory, combinatorial design, and discrete probability.

MS 322 Selected Survey of Secondary School Mathematics (3)
Prerequisite(s): MS 112 and 113 or equivalents.
For students pursuing certification in mathematics. Overview of secondary school mathematics for prospective and inservice teachers of mathematics. Department credit not given for mathematics majors or minors.

MS 323 College Geometry (3)
Prerequisite(s): MS 300.
Euclidean geometry including synthetic and analytic proofs, geometric constructions, properties of the triangle and circle; an introduction to non-Euclidean geometry.

MS 331 Peer Educator (1)
Academic credit given to advanced undergraduate students who provide tutorial assistance in the mathematics department. Students will work under the guidance of an experienced mathematics instructor. Permission of department head required. Department credit not given for mathematics majors or minors. MS 331 and MS 332 may be repeated up to a maximum combined total of six semesters. GRADE: Pass/Fail.

MS 332 Peer Educator (2)
Academic credit given to advanced undergraduate students provide tutorial assistance in the mathematics department. Students will work under the guidance of an experienced mathematics instructor. Permission of department head required. Department credit not given for mathematics majors or minors. MS 331 and MS 332 may be repeated for credit up to a maximum combined total of six semester hours. GRADE: Pass/Fail.

MS 344 Differential Equations (3)
Prerequisite(s): MS 126 with a "C" or better.
The methods of solving differential equations of first or second order and higher order linear equations, including series solutions and selected applications.

MS 352 Linear Algebra (3)
Prerequisite(s): MS 126 with a "C" or better.
Matrices, linear systems, vector spaces with emphasis on algebraic structures.

MS 390 Numerical Analysis (3)
Prerequisite(s): MS 352 and CS 230 (or a higher numbered computer science programming course) with a "C" or better in both.
Numerical analysis and computing with emphasis on methods adaptable to electronic computing machinery.

MS 397 Directed Readings in Undergraduate Mathematics (1)
Prerequisite(s): Advanced standing and approval of instructor.
This course may be repeated for credit up to a maximum of three hours.

MS 399 Study Tour (3)
Topics, excursions, and requirements determined by department. May be duplicated for credit; however, only three (3) credits may be applied toward any major or minor. Infrequently scheduled and subject to minimum and maximum numbers. Advanced deposit required.

MS 403 Vector Analysis (3)
Prerequisite(s): MS 227.
Algebra and calculus of vectors, Stokes theorem, and divergence theorem; applications to geometry, mass potential functions, electricity, and fluid flow.

MS 404 Mathematical Statistics II (3)
Prerequisite(s): MS 227 and 304.
Continuation of MS 304. The Central Limit Theorem, order statistics, functions of random variables, properties of estimators, confidence intervals, hypothesis testing, and least squares regression models.

MS 415 Advanced Calculus I (WI) (3)
Prerequisite(s): MS 227 and 300.
Real number system, elementary point set theory, limits, theory of continuous functions, differentiable functions. (Writing Intensive Course)

MS 416 Advanced Calculus II (3)
Prerequisite(s): MS 415.
Selected topics from advanced calculus, including differentiable functions, the Riemann integral, and sequences and series of functions.

MS 423 Survey of Geometries (3)
Prerequisite(s): MS 323.
Selected topics from advanced Euclidean geometry, finite geometries, non-Euclidean geometry, and other geometries.

MS 441 Abstract Algebra I (WI) (3)
Prerequisite(s): MS 300 and 352.
Introduction to ring theory and related topics: elementary number theory (integer divisibility, congruence, and modular arithmetic), rings, integral domains, fields, ring homomorphisms and isomorphisms, polynomial rings, and if time permits, ideals and factor rings. (Writing Intensive Course)

MS 442 Abstract Algebra II (3)
Prerequisite(s): MS 300 and 352.
Introduction to group theory and related topics: groups, cyclic groups, subgroups, cosets and Lagrange's theorem, group homomorphisms and isomorphisms.

MS 444 Applied Statistical Methods (3)
Prerequisite(s): MS 204 or MS 302 or ST 261.
Fundamental concepts of descriptive and inferential statistics, probability distributions, estimation and hypothesis testing. Statistical software and/or scripting used to facilitate analysis and interpretation of results. Emphasis on statistical techniques to analyze data.

MS 451 Functions of a Complex Variable (3)
Prerequisite(s): MS 415.
Fundamental operations with complex numbers, differentiation and integration theorems, mapping, series, and residues.

MS 475 Seminar in Mathematics (WI) (3)
Corequisite(s): MS 415 or MS 441 or MS 451.
Prerequisite or Goals include examining deeply the fundamental ideas of mathematics and connections among various branches of mathematics, exploring the historical development of major concepts, and further developing the habits of mind that define mathematical approaches to problems. (Writing Intensive Course)

MS 480 Introductory Topology (3)
Prerequisite(s): MS 415.
Basic topological concepts to include topological spaces, mapping, compactness, connectedness, and separation axioms.

MS 484 Partial Differential Equations (3)
Prerequisite(s): MS 227 and 344.
Standard methods of solution; separation of variables, Fourier Series, Laplace Transforms; selected applications.

MS 488 Mathematics Internship (1-6)
Prerequisite(s): Requires a faculty recommendation and permission of the department head.
(1-6). This course allows the student to gain experience in a job involving mathematics. The department head will approve the number of credit hours based on the scope of the project. Repeatable up to a total of 6 credit hours. Grades: Pass/Fail.

MS 499 Undergraduate Research in Mathematics (3)
Prerequisite(s): MS 302 or 304 or 415 or 441, senior standing, and approval of instructor.
A guided independent investigation of a topic outside the department's normal course offerings, to culminate in a written paper and oral presentation to the faculty. May be repeated for a total of 6 semester hours credit.