

M.A.M.Ed. and M.S.M.T. COURSE DESCRIPTIONS

M.A.M.Ed. students are required to take twelve of the seventeen courses listed below. Typically, M.A.M.Ed. students will take 610, 611, 612, 618, 620, 631, 640, 642, 660, 670, 680 and either 671 or 672. M.S.M.T students are required to take all seventeen courses.

M.A.M.Ed. and M.S.M.T. students should consult with the program director if they wish to replace some program requirements by courses in our other graduate mathematics programs.

M.A.M.Ed. and M.S.M.T. courses

Courses at the 600 level meet on weekends and courses at the 400 level meet in the evening. All courses are 4 credit hours on the quarter system.

610 - Calculus I: A review of topics from precalculus using algebraic, numerical, and graphical perspectives including linear functions, exponential functions, logarithms, polynomials, and trigonometric functions. An introduction to limits, continuity, the derivative, and basic properties of real numbers. Offered every Fall.

611 - Calculus II: A continuation of Math 610. The derivative and its applications, including optimization and related rates. Introduction to integration and numerical algorithms using graphing calculators. Offered every Winter. Prerequisite: Math 610

612 - Calculus III: A continuation of Math 611. Techniques of symbolic and numerical integration with geometric applications. Sequences, series, and power series. Offered every Spring. Prerequisite: Math 611

618 – Topics in Calculus and Differential Equations: Taylor series and Taylor's theorem, parametric equations, separable differential equations, slope fields, Euler's method. Offered every Summer. Prerequisite: Math 612

620 - Geometry: Axiom systems, types of reasoning used in proofs, Euclidean geometry results with concentration on triangles and circles, introduction to non-Euclidean geometry, and introduction to geometry classroom software. Offered every other Winter as of 2017. Prerequisite: Math 660

631 - History of Mathematics through Problem Solving: Topics include the development of calculus, probability theory, number theory, non-Euclidean geometry, and set theory. Offered every Winter. Corequisites: Math 620 and 670

640 - Multivariable Calculus I: Functions of several variables, vectors, dot products

and cross products, partial differentiation, directional derivatives, optimization, Lagrange multipliers, polar and spherical coordinates. Use of software packages to illustrate three-dimensional objects. Offered Fall 2017 and every Summer as of 2018. Corequisite: Math 618

642 – Multivariable Calculus II: Double and iterated integrals, area by double integrals, triple integrals, triple integrals in cylindrical and spherical coordinates, change of variable in multiple integration, line and surface integrals, theorems of Green, Stokes, and Gauss. Offered Winter 2018 and every Fall as of 2018. Prerequisite: Math 640

644 – Differential Equations: This course continues the study of differential equations (DE's) begun in MAT 618. Topics include solutions and applications of linear DE's, second order DE's with constant coefficients; linear systems; eigenvalues and eigenvectors of matrices, phase portraits and explicit solutions; nonlinear planar systems; linearization and stability analysis. Offered every other Spring as of 2018. Prerequisites: Math 618 and Math 672.

660 - Discrete Mathematics: Logic and techniques of proof, mathematical induction, sets and functions, relations, introduction to number theory and combinatorics. Offered every Fall.

670 - Abstract Algebra I: Examines the integers, prime numbers, the Euclidean algorithm, the uniqueness of prime factorization, equivalence relations, rational numbers, real numbers, and complex numbers. Provides examples of groups, rings, and fields and also covers the Fundamental Theorem of Algebra and roots of polynomials of small degree. Offered every other Winter as of 2018. Prerequisite: Math 660

671 - Abstract Algebra II: Examines modular arithmetic, the irreducibility of polynomials over different fields, criteria for solvability by radicals, rational values of trigonometric functions, difference functions, partial fraction decomposition, and geometric constructions with ruler and compass. Along with Math 670, this course provides the theoretical foundation for many topics covered in high school mathematics courses. Offered every other Spring as of 2018. Prerequisite: Math 670

672 – Linear Algebra: Vector spaces, linear combinations, spanning sets, linear independence, basis, dimension, systems of linear equations, matrices, linear transformations, eigenvalues and eigenvectors. Offered every other Spring as of 2019. Prerequisite: Math 660

680 – Real Analysis: Construction and properties of the real numbers. Proofs of essential results from calculus such as the intermediate value theorem, extreme value theorem, mean value theorem, existence of the Riemann integral, and Taylor's theorem. Offered every Fall. Prerequisites: Math 618 and Math 660

451 – Probability and Statistics I: This course covers elements of probability theory; distributions of random variables and linear functions of random variables; moment generating functions; and discrete and continuous probability models. Offered every Fall. Prerequisite: Math 640

452 – Probability and Statistics II: A continuation of MAT 451. More continuous probability model. Laws of large numbers and the central limit theorem. Sampling distributions of certain statistics. An introduction to the theory of estimation and principals of hypothesis testing. Offered every Winter. Prerequisites: Math 451 and Math 642

470 – Advanced Linear Algebra: Vector spaces, basis and dimension; matrix representation of linear transformations and change of basis; diagonalization of linear operators; inner product spaces; diagonalization of symmetric linear operators, principal-axis theorem, and applications. Offered every Fall. Prerequisite: Math 672.