
Mathematics Course Descriptions

Courses are offered each semester unless otherwise designated.

MATH 195, 295, 395, 495, 595, 695 – Special Topics (1-12)

MATH 198, 298, 398, 498, 598, 698 – Tutorial (1-3)

MATH 100 – Excursions in Mathematics (3) This is an introduction to mathematics as an exciting and creative discipline. Students will explore recent developments and mathematical ideas that have intrigued humanity for ages. This course does not satisfy the B.A. in Elementary Education mathematics concentration requirement. Prerequisite: two years of high school mathematics. Fall and Spring. Gen Ed: FM credit.

MATH 101 – Mathematics for Elementary Education I (3) Topics in foundations of mathematics include: problem solving strategies, abstract and symbolic representation, numeration and number systems, functions and use of variables. Satisfies one of the mathematics concentration requirements for the B.A. in Elementary Education. Not required for double majors in mathematics and elementary education. Prerequisite: three years of high school Regents level mathematics or permission. Fall and Spring. Gen Ed: FM credit.

MATH 102 – Mathematics for Elementary Education II (3) Topics in Euclidean and non-Euclidean geometry including: shapes in two and three dimensions, symmetries, transformations, tessellations, coordination geometry, measurement. Satisfies one of the mathematics concentration requirements for the B.A. in Elementary Education. Not required for double majors in mathematics and elementary education. Prerequisite: MATH 101. Fall and Spring. Gen Ed: FM credit.

MATH 110 – Pre-Calculus Mathematics (4) Provides mathematical background sufficient for study of calculus. Emphasis on real functions, including polynomial, trigonometric and inverse functions. Not for major credit. Gen Ed: FM credit.

MATH 125 – Probability and Statistics I (3) Elementary probabilistic and descriptive statistical concepts as applied to practical problems from other disciplines and an introduction to methods of statistical inference. Prerequisite: high school algebra or equivalent. Not open to students who have passed another introductory level statistics course (e.g., CIS 125, STAT 100). Satisfies one of the mathematics concentration requirements for B.A. in Elementary Education. Fall and Spring. Gen Ed: FM credit.

MATH 126 – Probability and Statistics II (3) Methods of statistical inference, both non-parametric and classical, as applied to problems of interest to a wide range of disciplines. Prerequisite: MATH 125. As demand warrants.

MATH 130 – Mathematical Origins (3) This course is designed to introduce students to the historical development of mathematics in various cultures. The main focus will be on Ancient Egyptian, Mesopotamian, Chinese, Indian, and Greek cultures. As demand warrants. Gen Ed: XC credit.

MATH 151 – Calculus I (4) Continuity and differentiability of real valued algebraic and trigonometric functions of a single variable, applications and antidifferentiation. Required for mathematics majors. Prerequisite: three years of high school mathematics or MATH 110. Fall and Spring. Gen Ed: FM credit.

MATH 152 – Calculus II (4) Differentiation of transcendental functions, integration with applications, sequences and series. Required for Mathematics majors. Prerequisite: MATH 151. Fall and Spring. Gen Ed: FM credit.

MATH 253 – Multivariate Calculus (4) Real vectors in two and three dimensions, relations and functions in several variables. Partial differentiation and iterated integrals. Required for Mathematics majors. Prerequisite: MATH 152. Fall and Spring. Gen Ed: FM credit.

MATH 340 – Set Theory and Logic (3) Elementary logic, including sentential calculus and mathematical induction. Basic properties of sets, relations and

functions. Denumerable and non-denumerable sets. Designed as an

introduction to the nature of mathematical proof. Required for Mathematics majors. Prerequisite: MATH 152. Fall and Spring. Gen Ed: WI credit.

MATH 375 – Linear Algebra I (3) Theoretical development of finite dimensional vector spaces and linear transformations; the relationships among matrices, systems of equations and linear transformations. Required for Mathematics majors. Prerequisites: Math 152 and 340. Fall and Spring.

MATH 390 – Differential Equations (3) Existence and uniqueness of solutions of classes of ordinary differential equations and techniques for finding such solutions. Prerequisite: MATH 253.

MATH 404 – Elements of Geometry (3) Foundations of Euclidean and Non-Euclidean geometry; nature of axiomatic systems; Hilbert's axioms for plane Euclidean geometry; the geometry of Bolyai-Lobachevsky and transformational geometry. Prerequisite: MATH 340. Fall only.

MATH 423 – Modern Algebra I (3) Elementary theory of groups and rings. Required for mathematics majors. Required for Mathematics majors. Prerequisites: Math 152 and 340. MATH 375 recommended. Fall and Spring.

MATH 425 – Applied Combinatorics (3) Basics of combinatorics; basics of graphs, including trees; recurrence relations and applications; other selected topics as time allows. Prerequisite: MATH 340 or CIS 301.

MATH 451 – Advanced Calculus I (3) Sequences, completeness of the Real Numbers, metric spaces, limits and continuity of functions, connectedness, compactness. Prerequisite: MATH 253 and 340. MATH 375 recommended. Fall and Spring.

MATH 452 – Advanced Calculus II (3) Integration, spaces of functions, sequences and series. May be used for major elective. Prerequisite: MATH 451. Spring only.

MATH 460 – Problem Seminar (3) Students demonstrate mathematical maturity by solving problems selected from different areas of mathematics. Required for mathematics majors. Prerequisites: MATH 375, 423 and 451. Fall and Spring. Gen Ed: SI credit.

MATH 461 – Probability and Mathematical Statistics I (3) Probability, random variables, distributions, stochastic independence, moment generating functions, limit theorems and their applications, estimation. Prerequisite: MATH 253. Fall only.

MATH 522 – Number Theory (3) Divisibility, simple continued fractions, congruences, diophantine equations and quadratic residues. Prerequisites: MATH 152 and 340. As demand warrants.

MATH 524 – Modern Algebra II (3) Topics in the theory of groups, rings and fields, such as factorization and Galois theory. May be used for major elective. Prerequisites: MATH 423. MATH 375 recommended. Spring only.

MATH 526 – Linear Algebra II (3) Selected topics: inner product spaces, canonical forms, bilinear and quadratic forms. May be used for major elective. Prerequisites: MATH 375 and permission. As demand warrants.

MATH 541 – Introduction to Topology (3) Open and closed sets, continuous functions, compactness, connectedness, separation properties and product spaces. May be used for major elective. Prerequisite: MATH 451. Spring only.

MATH 542 – Intro to Algebraic Topology (3) Concept of homotopy, fundamental group, covering spaces, integral homology and cohomology. Prerequisite: MATH 541. As demand warrants.

MATH 543 – Topics in Topology (3) Topics such as surfaces and manifolds, knot theory, geometry of the hyperbolic plane, dimension theory, geometry in higher dimensions. Prerequisites: MATH 375, 423 and 451. May not be repeated for additional credit. As demand warrants.

MATH 547 – Theory of Sets (3) Theoretical set concepts, axioms of set

theory; axioms of choice and Zorn's lemma, ordinals and cardinals, transfinite induction. May be used for major elective. By invitation only. Prerequisites: MATH 340 and permission. Spring only.

MATH 553 – Concepts of Geometry (3) Topics from Euclidean and non-Euclidean geometries: theory of transformations of the plane, elements of projective geometry, etc. May be used for major elective. Prerequisites: MATH 375 and 423. Spring only.

MATH 562 – Probability and Mathematical Statistics II (3) Sampling distributions, tests of hypotheses, linear regression, non-parametric methods, sufficient statistics and further topics in statistical inference. May be used for major elective. Prerequisite: MATH 461. Spring only.

MATH 567 – Complex Variables/Applications (3) Complex numbers, analytic functions, contour integration, power series, conformal mapping, residues and poles. May be used for major elective. Prerequisite: MATH 451. Spring only.

MATH 661 – Topology I (3) Ordinals and cardinals, topological spaces, metric spaces, Cartesian products, connectedness, identification topology, weak topologies, separation axioms. Prerequisite: MATH 451. Spring only.

MATH 662 – Topology II (3) Continuation of MATH 661. Second countable spaces, filter bases, compactness and function spaces. Prerequisite: MATH 661. As demand warrants.

MATH 671 – Abstract Algebra I (3) Groups, Sylow theorems, rings, modules. Prerequisites: MATH 375 and permission. Fall only.

MATH 672 – Abstract Algebra II (3) Continuation of MATH 671. Galois theory, structure theorem for semisimple rings, injective and projective modules, introduction to homological algebra. Prerequisites: MATH 671 and permission. Spring only.

MATH 681 – Complex Variables I (3) Complex numbers, holomorphic functions, Cauchy's integral theorem and formula. Taylor and Laurent series, residue calculus, analytic functions and analytic extension. Prerequisites: MATH 451 and permission. Spring only.

MATH 682 – Complex Variables II (3) Continuation of MATH 681. Conformal mapping, Riemann mapping theorem and Dirichlet problem, representation of entire functions and meromorphic functions. Prerequisites: MATH 681 and permission. As demand warrants.

MATH 691 – Real Variables I (3) Real number system, comparison of Riemann integral and Lebesgue integral, measurable functions. Lebesgue Dominated Convergence Theorem. Prerequisites: MATH 451 and permission. Fall only.

MATH 692 – Real Variables II (3) Continuation of MATH 691. Normed linear spaces, Hilbert spaces, modes of convergence, Radan-Nikodym theorem, Riesz representation theorem, Fubini's theorem. Prerequisites: MATH 691 and permission. Spring only.

MATH 696 – Advanced Topics (3) Seminars in advanced topics from various branches of mathematics. May be repeated if content changes. Prerequisite: permission. As demand warrants.

MATH 698 – Seminar: Tutorial (3) Study of current topics in mathematics as found in research articles or reference texts. Prerequisites: four of the 600 level graduate mathematics courses required for the M.A. degree and permission of the department chair. May be repeated if content changes. As demand warrants.