Department of Mathematics

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. Gen Ed: FM credit. Fall and Spring.

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. Gen Ed: FM credit. Fall and Spring.

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. Gen Ed: FM credit. Fall and Spring.

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 As warranted.

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). Gen Ed: FM credit. Fall and Spring.

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 warranted.

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. Gen Ed: XC credit. As warranted.

MATH 141 – Integrated calculus, IA (4) First course of a two-semester sequence that provides mathematical background sufficient for study of calculus and integrates it with the study of calculus. Recommended for students who need a stronger preparation or Calculus I. TI-83 or compatible required. Completion of this two-semester sequence is equivalent to the completion of MATH 110 (Precalculus) and MATH 151 (Calculus I). Gen Ed: FM credit.

MATH 142 – Integrated Calculus, IB (4) Second course of a two-semester sequence that provides mathematical background sufficient for study of calculus and integrates it with the study of calculus. Recommended for students who need a stronger preparation for Calculus I. TI-83 or compatible required. Completion of this two-semester sequence is equivalent to the completion of MATH 110 (Precalculus) and MATH 151 (Calculus I). Prerequisite: MATH 141.

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. Gen Ed: FM credit. Fall and Spring.

MATH 152 – Calculus II (4) Differentiation of transcendental functions, integration with applications, sequences and series. Required for Mathematics majors. Prerequisite: MATH 151 or 142. Gen Ed: FM credit. Fall and Spring.

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. Gen Ed: FM credit. Fall and Spring.

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. Gen Ed: WI credit. Fall and Spring.

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. Spring

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.

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.

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. Gen Ed: SI credit. Fall and Spring.

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.

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

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. Prerequisite: MATH 423. (MATH 375 recommended). Spring.

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. Fall.

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.

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

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 warranted.

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.

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.

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. As warranted.

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.