

MATHEMATICS

MATH 0005 Intermediate Algebra (3)

Prerequisite: A satisfactory score on the university's mathematics placement examination, obtained in the six months prior to enrollment in this course. Preparatory material for college level mathematics courses. Covers systems of linear equations and inequalities, polynomials, rational expressions, exponents, quadratic equations, graphing linear and quadratic functions. This course carries no credit toward any baccalaureate degree.

MATH 1020 Contemporary Mathematics (3) [MS]

Prerequisites: A satisfactory score on the university's mathematics placement examination, obtained in the six months prior to enrollment in this course a score of 22 or higher on the ACT Math sub-test, or a grade of C or better in a two or four year college intermediate algebra course. Presents methods of problem solving, centering on problems and questions which arise naturally in everyday life. May include aspects of algebra and geometry, the mathematics of finance, probability and statistics, exponential growth, and other topics chosen from traditional and contemporary mathematics which do not employ the calculus. May be taken to meet the mathematical proficiency requirement, but may not be used as a prerequisite for other mathematics courses. Designed for students who do not plan to take Calculus. Credit will not be granted for MATH 1020 if credit has been granted for MATH 1310, MATH 1800, MATH 1100, MATH 1102, or MATH 1105. Concurrent enrollment in MATH 1020 and any of these courses is not permitted.

MATH 1030 College Algebra (3) [MS]

Prerequisites: A satisfactory score on the university's mathematics placement examination, obtained in the six months prior to enrollment in this course, a score of 22 or higher on the ACT Math sub-test, or a grade of C or better in a two or four year college intermediate algebra course. Topics in algebra and probability, polynomial functions, the binomial theorem, logarithms, exponentials, and solutions to systems of equations.

MATH 1035 Trigonometry (2) [MS]

Prerequisite: MATH 1030 or concurrent registration, or a satisfactory ACT Math score, or a satisfactory score on the university's mathematics proficiency examination. A study of the trigonometric and inverse trigonometric functions with emphasis on trigonometric identities and equations.

MATH 1100 Basic Calculus (3) [MS]

Prerequisite: MATH 1030, or a satisfactory ACT Math score, or a satisfactory score on the university's mathematics proficiency examination. Introduction to plane analytic geometry and basic differential and integral calculus with application to various areas. No credit for Mathematics majors. Credit not granted for both MATH 1800 and MATH 1100.

MATH 1102 Finite Mathematics (3)

Prerequisite: MATH 1030, or a satisfactory ACT Math score, or a satisfactory score on the university's proficiency examination. Introductory logic and set theory, partitions and counting problems, elementary probability theory, stochastic processes, Markov chains, vectors and matrices, linear programming, and game theory.

MATH 1105 Basic Probability and Statistics (3) [MS]

Prerequisite: MATH 1030, or a satisfactory ACT Math score, or a satisfactory score on the university's mathematics proficiency examination. An introduction to probability and statistics. Topics include the concept of probability and its properties, descriptive statistics, discrete and continuous random variables, expected value, distribution functions, the central limit theorem, random sampling and sampling distributions. Credit not granted for more than one of MATH 1310, MATH 1320 and MATH 1105.

MATH 1150 Structure of Mathematical Systems I (3) [MS]

Prerequisites: 45 hours of college credit and one of the following: MATH 1030, a satisfactory ACT Math score, or a satisfactory score on the university's mathematics proficiency examination. A study of sets, relations, functions, whole numbers; the integers and their properties, and the rational and real number systems.

MATH 1310 Elementary Statistical Methods (3)

Prerequisite: MATH 1030, or a satisfactory ACT Math score, or a satisfactory score on the university's mathematics proficiency exam. An introduction to the basic ideas and tools of statistics. Introductory data analysis, statistical modeling, probability and statistical inference. Includes topics in estimation, prediction, and hypothesis testing. A major focus of the course is the analysis of data using a computer software package such as SAS. A student may not receive credit for more than one of MATH 1310, MATH 1320, and MATH 1105.

MATH 1320 Applied Statistics I (3)

Prerequisite: MATH 1800 or MATH 1100 or equivalent. This is the first course of a one-year sequence in introductory probability and statistics. It provides a comprehensive introduction to those models and methods which are most likely to be encountered by students in their careers in applied mathematics and the sciences. Topics include descriptive statistics, basics of probability theory, random variables and their distributions, sampling distributions, confidence intervals, and hypothesis testing for population means and population proportions. A student may not receive credit for more than one of MATH 1320, MATH 1310 and MATH 1105.

MATH 1800 Analytic Geometry and Calculus I (5) [MS]

Prerequisites: MATH 1030 and MATH 1035, or a satisfactory ACT Math score along with a satisfactory score on the university's trigonometry examination, or a satisfactory score on both the university's mathematics proficiency examination and the university's trigonometry examination. This course provides an introduction to differential and integral calculus. Topics include limits, derivatives, related rates, Newton's method, the Mean-Value Theorem, Max-Min problems, the integral, the Fundamental Theorem of Integral Calculus, areas, volumes, and average values.

MATH 1900 Analytic Geometry and Calculus II (5)

Prerequisite: MATH 1800. Topics include conic sections, rotations of axes, polar coordinates, exponential and logarithmic functions, inverse (trigonometric) functions, integration techniques, applications of the integral (including mass, moments, arc length, and hydrostatic pressure), parametric equations, infinite series, power and Taylor series.

MATH 2000 Analytic Geometry and Calculus III (5)

Prerequisite: MATH 1900. Topics include vectors, cylindrical and spherical coordinates, vector-valued functions, arc length and curvature, functions of several variables, partial and directional derivatives, gradients, extrema, Lagrange multipliers, multiple integrals, change of variables, surface area, vector fields, Stokes' Theorem.

MATH 2020 Introduction to Differential Equations (3)

Prerequisite: MATH 2000. Topics will be chosen from linear differential equations, equations with constant coefficients, Laplace transforms, power series solutions, systems of ordinary differential equations.

MATH 2450 Elementary Linear Algebra (3)

Prerequisite: MATH 1100 or MATH 1900. An introduction to linear algebra. Topics will include complex numbers, geometric vectors in two and three dimensions and their linear transformations, the algebra of matrices, determinants, solutions of systems of equations, eigenvalues and eigenvectors.

MATH 2510 Structure of Mathematical Systems II (3) [MS]

Prerequisite: MATH 1150. An introduction to probability and statistics. An intuitive study of elementary geometry. Introduction to the deductive theory of geometry and to coordinate geometry.

MATH 3000 Discrete Structures (3)

Prerequisites: MATH 1900 or 1100, and CMP SCI 1250 or equivalent. Treats fundamental ideas in discrete structures and serves as a foundation for subsequent course in both Mathematics and Computer Science. Provides an introduction to techniques of mathematical reasoning with examples derived from computer science. Topics include logic, set algebra, equivalence relations and partitions, functions, mathematical induction, elementary number theory, cardinality, recurrence relations, basic combinatorial methods, trees and graphs. Credit not granted for more than one of CMP SCI 3000 and MATH 3000.

MATH 3520 Structure of Mathematical Systems III (3) [MS]

Prerequisite: MATH 2510. Together with MATH 1150 and 2510, this course teaches mathematics necessary for middle school mathematics certification. Topics from MATH 1150 and 2510 are continued. Other topics include geometric constructions, similarity, coordinate geometry, normal distribution, combinatorics, and trigonometry. Credit will be granted only toward the B.S. in education degree in Early Childhood Education, Elementary Education, Middle School Education and Special Education.

MATH 4030 Applied Mathematics I (3)

Prerequisites: MATH 2020 and MATH 2450. Topics chosen from Fourier series, special functions, partial differential equations, and boundary value problems.

MATH 4060 Applied Differential Equations (3)

Prerequisites: MATH 2020 and MATH 2450. The study of ordinary differential equations and partial differential equations is continued with applications in such areas as physics engineering and biology.

MATH 4100 Real Analysis I (3)

Prerequisites: MATH 2000 and MATH 3000. Introduction to real analysis in one variable. Topics include the real number system, limits, continuity, differentiability, and sequences and series of functions.

MATH 4110 Advanced Calculus (3)

Prerequisites: MATH 2000, MATH 2450 and MATH 3000. Multivariable analysis, inverse and implicit functions theorems, calculus on manifolds.

MATH 4160 Complex Analysis I (3)

Prerequisites: MATH 2020 or both MATH 3000 and MATH 2000. Complex numbers and their geometrical representation, point sets, analytic functions of a complex variable, complex integration, Taylor and Laurent series, residue theorem, conformal mapping.

MATH 4200 Mathematical Statistics I (3)

Prerequisites: MATH 1320 and MATH 2000. Introduction to the theory of probability and statistics using concepts and methods of calculus.

MATH 4210 Mathematical Statistics II (3)

Prerequisite: MATH 4200. Continuation of MATH 4200. Sampling distribution, estimation theory, properties of estimators, hypothesis testing, Neyman-Pearson Theorem, likelihood ratio tests, introduction of analysis of variance and linear models. Basics of some nonparametric procedures.

MATH 4230 Numerical Analysis I (3)

Prerequisites: MATH 2020, MATH 2450, and ability to program in an upper-level language. Solutions of equations, interpolation and approximation, numerical differentiation and integration, and numerical solution of initial value problems in ordinary differential equations. Selected algorithms will be programmed for solution on computers.

MATH 4260 Introduction to Stochastic Processes (3)

Prerequisite: MATH 4200. Basic theory and applications of stochastic processes. Markov chains, martingales, recurrent and transient states, stationary distributions, ergodic theorem, renewal processes, discrete martingales and stationary processes.

MATH 4300 Multivariate Analysis (3)

Prerequisites: MATH 2450 and MATH 4200, or consent of instructor. Multivariate normal distribution and related sampling distributions. Procedures of statistical inference for the multivariate normal distributions, such as hypothesis testing, parameter estimations, multivariate regression, classification and discriminant analysis and principal components analysis.

MATH 4310 Analysis of Variance and Design of Experiments (3)

Prerequisites: MATH 2450 and MATH 4200 or consent of instructor. An introduction to the analysis of variance with applications in completely randomized designs, randomized block designs, factorial experiments and split-plot type designs.

MATH 4320 Regression Models in Statistics (3)

Prerequisite: MATH 2320 or consent of instructor. A rigorous course focused on the applications of regression. The course is rigorous in that the basic regression models in one and several variables are carefully developed using matrix notation. Topics such as the extra sums of squares principle, the general linear hypothesis, and partial and sequential F-tests are carefully presented. The course will focus on using these tools to analyze many different data sets.

MATH 4330 Nonparametric Methods in Statistics (3)

Prerequisite: MATH 4200 or consent of instructor. An introduction to nonparametric statistical procedures. Order statistics, rank order statistics and scores, tests of goodness of fit, linear rank tests for the location and scale problems and applications.

MATH 4350 Theory of Numbers (3)

Prerequisites: MATH 3000 and MATH 2000 or consent of instructor. Properties of integers, multiplicative functions, congruences, primitive roots, and quadratic residues.

MATH 4390 Topics in Probability and Statistics (3)

Prerequisite: Consent of instructor. A seminar on special topics in probability and statistics to be determined by the interests of the instructor. May be determined by the interests of the instructor. May be repeated for credit provided different topics are studied.

MATH 4400 Introduction to Abstract Algebra I (3)

Prerequisites: MATH 3000 and MATH 2000 or consent of the department. Introduction to groups, rings, and fields, with emphasis on groups and rings.

MATH 4450 Linear Algebra (3)

Prerequisites: MATH 3000, MATH 2000 and MATH 2450. Topics selected from vector spaces, bases, linear transformations, matrices, canonical forms, eigenvalues, hermitian and unitary matrices, inner product spaces, and quadratic forms.

MATH 4500 Special Readings (1-10)

Prerequisites: MATH 3000, MATH 2000 and consent of instructor.

MATH 4550 Combinatorics (3)

Prerequisites: MATH 3000 and MATH 2000. Advanced counting methods are introduced, including the use of generating functions for the solution of recurrences and difference equations. Additional topics may include: graphs and trees, combinatorial designs, combinatorial games, error-correcting codes, and finite-state machines.

MATH 4640 Introduction to Differential Geometry (3)

Prerequisites: MATH 3000 and MATH 2000. Geometry of curves and surfaces in Euclidean three-space. Calculus on a surface. Intrinsic geometry of surfaces.

MATH 4660 Foundations of Geometry (3)

Prerequisites: MATH 3000 and MATH 2000 or consent of department. A development of portions of Euclidean geometry from a selected set of axioms, including a discussion of consistency, independence, categoricity, and completeness of the axioms.

MATH 4670 Introduction to Non-Euclidean Geometry (3)

Prerequisites: MATH 3000 and MATH 2000 or consent of the department. A summary of the history of the non- Euclidean geometries and a study of hyperbolic plane geometry.

MATH 4800 Introduction to Topology (3)

Prerequisites: MATH 3000 and MATH 2000 or consent of the department. A study of topological spaces, including the concepts of limit, continuity, connectedness, compactness, etc. Special emphasis placed on, and examples taken from, the space of real numbers.

MATH 4890 Topics in Mathematics (3)

Prerequisite: Consent of instructor. A seminar on special topics in mathematics to be determined by the interests of the instructor. May be repeated for credit provided different topics are studied.



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