

MATHEMATICS (MATH)

A grade of C or better is required for prerequisite courses.

MATH 091 Special Topics (1-4 V)

As Needed.

Special topics are offered to students in areas where regular course offerings are not available. This course does not count toward graduation.

Prerequisite: None.

Corequisite: None.

Registration Information: Satisfactory placement exam score. Repeatable (99).

MATH 096 College Prep Math 1 3(3-)

Fall, Spring.

Operations with real numbers. Solving and graphing linear equations with applications. Polynomial addition, subtraction, multiplication and division. This course does not count toward graduation.

Prerequisite: None.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent.

MATH 097 College Prep Math 2 3(3-)

Fall, Spring.

Factoring polynomials, solving polynomial equations. Rational expressions and equations with applications. Inequalities and absolute value. Quadratic functions with applications. This course does not count towards graduation.

Prerequisite: MATH 096.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent.

MATH 101 Introductory College Mathematics (GT-MA1) 3(3-0)

Fall, Spring, Summer.

Solving systems of linear equations. Introduction to functions. Operations with radical expressions. Solving radical equations. Exponential and logarithmic functions with applications.

Prerequisite: MATH 097.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent. (GT-MA1)

MATH 109 Mathematical Explorations (GT-MA1) (3 V)

Fall, Spring.

Emphasis on quantitative reasoning and problem solving. Topics chosen from: logic, sets, algebra, linear programming, probability, statistics, number theory, geometry, voting theory and graph theory.

Prerequisite: MATH 097.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent. (GT-MA1)

MATH 120 College Algebra (GT-MA1) 3(3-0)

Fall, Spring.

Solutions of algebraic equations, graphs of rational functions, exponential and logarithmic functions.

Prerequisite: MATH 101.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent. (GT-MA1)

MATH 122 College Trigonometry (3 V)

As Needed.

Trigonometric and circular functions, identities, inverse functions, vectors, complex numbers.

Prerequisite: MATH 120.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent.

MATH 124 Pre-Calculus (GT-MA1) 5(5-0)

Fall, Spring.

Polynomial, rational, exponential and logarithmic functions; solution of systems of equations; trigonometric, circular and certain special functions.

Prerequisite: MATH 120.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent. (GT-MA1)

MATH 126 Calculus & Analytic Geometry I (GT-MA1) 5(5-0)

Fall, Spring.

Introduction to limits, continuity, differentiation and integration with selected applications.

Prerequisite: MATH 122 or MATH 124.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent. (GT-MA1)

MATH 156 Introduction to Statistics (GT-MA1) 3(3-0)

Fall, Spring, Summer.

Introduction to data analysis. Binomial and normal models. Sample statistics, confidence intervals, hypothesis tests, linear regression and correlation, and chi-square tests.

Prerequisite: MATH 101.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent. (GT-MA1)

MATH 191 Special Topics (1-5 V)

As Needed.

Special topics suitable for entry level math students.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor or department chair. Repeatable (99).

MATH 207 Matrix and Vector Algebra with Applications 3(3-0)

Fall, Spring.

Systems of equations, matrices, inverses, determinants, eigenvalues and eigenvectors, scalar and cross-product, selected applications.

Prerequisite: MATH 124.

Corequisite: None.

Registration Information: None.

MATH 220 Quantitative Analysis for Business 4(4-0)

Fall, Spring, Summer.

An introduction to quantitative methods required for business studies, including linear programming, probability and statistics.

Prerequisite: MATH 101.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent.

MATH 221 Applied Calc: An Intuitive Approach (GT-MA1) 4(4-0)

Fall, Spring.

Non-rigorous introduction to calculus with emphasis on applications and modeling in the life sciences, social and behavioral sciences and business.

Prerequisite: MATH 120.

Corequisite: None.

Registration Information: Satisfactory placement exam score or equivalent.
(GT-MA1)**MATH 224 Calculus and Analytic Geometry II 5(5-0)**

Fall, Spring.

Differentiation and integration of transcendental functions, infinite sequences and series, parametric curves, and applications.

Prerequisite: MATH 126.

Corequisite: None.

Registration Information: None.

MATH 242 Introduction to Computation 4(3-2)

Spring.

Computer programming and computation with applications. Loops, conditionals, data types and structures, I/O, functions debugging, testing, and documentation. Numerical, graphical, symbolic computation issues and projects.

Prerequisite: MATH 126.

Corequisite: None.

Registration Information: None.

MATH 291 Special Topics (1-5 V)

As Needed.

Special Topics.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor and approval of the department chair. Repeatable (99).

MATH 295 Independent Study (1-5 V)

As Needed.

Independent Study.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor. Repeatable (99).

MATH 307 Introduction to Linear Algebra 4(4-0)

Spring.

A rigorous development of vector spaces and linear transformations.

Prerequisite: MATH 207 or MATH 224.

Corequisite: None.

Registration Information: None.

MATH 319 Number Theory (3 V)

Spring, Odd.

Divisibility, prime numbers, linear congruences, multiplicative functions, cryptology, primitive roots, and quadratic residues.

Prerequisite: MATH 224.

Corequisite: None.

Registration Information: None.

MATH 320 Introductory Discrete Mathematics 3(3-0)

Fall.

Introduction to discrete structures with emphasis on logic and proof.

Topics selected from graph theory, boolean algebra, combinatorics, binary relations, set theory, functions and sequences.

Prerequisite: MATH 224.

Corequisite: None.

Registration Information: None.

MATH 325 Intermediate Calculus 4(4-0)

Fall.

Continuation of MATH 224. Vector valued functions and multivariable calculus.

Prerequisite: MATH 224.

Corequisite: None.

Registration Information: None.

MATH 330 Introduction to Higher Geometry (3 V)

Spring, Even.

Euclidean, hyperbolic, finite, and transformation geometries, models, and constructions.

Prerequisite: MATH 224.

Corequisite: None.

Registration Information: Permission of instructor.

MATH 337 Differential Equations I 3(3-0)

Spring.

First order differential equations, homogeneous and non-homogenous linear differential equations, introduction to the Laplace transform, applications.

Prerequisite: MATH 224.

Corequisite: None.

Registration Information: None.

MATH 338 Differential Equations II 3(3-0)

Fall, Odd.

Linear systems, existence and uniqueness of solutions, non-linear equations, series solutions, orthogonal sets of functions. Fourier series, boundary value problems, partial differential equations and applications.

Prerequisite: MATH 337.

Corequisite: None.

Registration Information: MATH 325 is recommended as prerequisite.

MATH 342 Introduction to Numerical Analysis 3(3-0)

Spring, Even.

Numerical solutions of polynomial, differential, integral, and other equations using the computer.

Prerequisite: MATH 224.

Corequisite: None.

Registration Information: Programming language recommended.

Permission of instructor.

MATH 345 Algorithms & Data Structures 4(3-2)

Spring, Odd.

An introduction to data structures, sorting, searching, recurrence relations and performance measures. Algorithms will be studied analytically and through computer implementation.

Prerequisite: MATH 224 and MATH 242.

Corequisite: None.

Registration Information: None.

MATH 350 Probability 3(3-0)

Spring.

Introduction to probability theory and stochastic processes. Probability spaces, random variables and their distributions, exponential and Poisson processes, limit theorems and applications.

Prerequisite: MATH 325.

Corequisite: None.

Registration Information: None.

MATH 356 Statistics for Engineers & Scientists 3(3-0)

Fall.

Calculus-based introduction to statistical methods. Sampling distributions, hypothesis testing, linear regression, design of experiments using ANOVA. Data analysis with Minitab.

Prerequisite: MATH 350.

Corequisite: None.

Registration Information: None.

MATH 360 Elementary Mathematics Concepts I 3(3-0)

Fall.

Development of the real number system and related concepts, including sets, numeration systems, whole numbers, integers, number theory and algorithms.

Prerequisite: None.

Corequisite: None.

Registration Information: MATH 101 or MATH 109 recommended as prerequisite. Satisfactory placement score.

MATH 361 Elementary Mathematics Concepts II 3(3-0)

Spring.

Conceptual development of fractions, rational numbers, geometry, measurement, probability and statistics.

Prerequisite: MATH 360.

Corequisite: None.

Registration Information: Satisfactory placement score.

MATH 362 Problem Solving for K-6 Teachers 3(3-0)

Fall.

This course focuses on the process of mathematical problem solving. Students will develop and implement useful heuristics, and reflect on problem solving strategies.

Prerequisite: MATH 361.

Corequisite: None.

Registration Information: Liberal Studies General Education Mathematics requirement met.

MATH 411 Introduction to Topology 3(3-0)

As Needed.

An introduction to topological spaces, homeomorphisms, topological properties, and separation axioms.

Prerequisite: MATH 319 or MATH 320 or MATH 330.

Corequisite: None.

Registration Information: None.

MATH 421 Introduction to Analysis 4(4-0)

Spring.

An introductory course in real analysis providing a rigorous development of the concepts of elementary calculus.

Prerequisite: MATH 319 or MATH 320 or MATH 330 and MATH 325.

Corequisite: None.

Registration Information: None.

MATH 425 Complex Variables 3(3-0)

Fall, Even.

An introduction to complex function theory. Complex numbers, sequences and series, the calculus of complex functions, analytic functions, and conformal mappings.

Prerequisite: MATH 325.

Corequisite: None.

Registration Information: None.

MATH 427 Abstract Algebra 4(4-0)

Fall.

Introduction to groups, rings and fields and their elementary properties.

Prerequisite: MATH 307 and MATH 319 or MATH 320 or MATH 330.

Corequisite: None.

Registration Information: None.

MATH 442 Machine Learning for Data Analytics 3(2-2)

As Needed.

Implementation of algorithms for supervised and unsupervised learning, to include linear/logistic regression, random forests, naïve Bayes, neural networks, clustering, support vector machines, hidden markov models.

Prerequisite: MATH 242.

Corequisite: None.

Registration Information: None.

MATH 445 Discrete Mathematics 3(3-0)

As Needed.

Topics selected from mathematical reasoning, combinatorial techniques, set theory, binary relations, functions and sequences, algorithm analysis, and discrete analysis.

Prerequisite: MATH 224 and MATH 307.

Corequisite: None.

Registration Information: Knowledge of a programming language.

MATH 463 History of Mathematics 3(3-0)

Fall, Odd.

Survey of the origins of important mathematical concepts and of the mathematicians responsible for these discoveries.

Prerequisite: MATH 319 or MATH 320 or MATH 330.

Corequisite: None.

Registration Information: None.

MATH 477 Methods for Teaching Secondary Math 4(3-2)

Fall, Even.

Topics and issues in secondary mathematics education, including materials development, learning theories, instructional and assessment strategies, curriculum, planning and standards. Sixty hours field experience required.

Prerequisite: MATH 319 or MATH 320 or MATH 330.

Corequisite: None.

Registration Information: Acceptance into Teacher Education Program.

MATH 480 Tutoring Practicum (1-2 V)

As Needed.

Participation in tutoring mathematics in the MLC under the guidance of the MLC Director.

Prerequisite: MATH 224.

Corequisite: None.

Registration Information: Permission of Math Learning Center Director. Repeatable (2).

MATH 491 Special Topics (1-3 V)

As Needed.

Special Topics.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor. Repeatable (99).

MATH 492 Research (1-3 V)

As Needed.

Research project selected by student and supervised by a regular mathematics faculty member.

Prerequisite: None.

Corequisite: None.

Registration Information: Approval of department. Repeatable (99).

MATH 493 Seminar (1-3 V)

As Needed.

Seminar.

Prerequisite: None.

Corequisite: None.

Registration Information: Senior standing. Permission of instructor. Repeatable (99).

MATH 495 Independent Study (1-3 V)

As Needed.

Independent Study.

Prerequisite: None.

Corequisite: None.

Registration Information: Senior standing. Permission of instructor. Repeatable (99).

MATH 498 Internship (1-6 V)

As Needed.

Work experience using the discipline of mathematics under the direction of the selected organization and a faculty member.

Prerequisite: None.

Corequisite: None.

Registration Information: Junior or senior standing. Permission of department chair. Repeatable (99).

MATH 501 Foundations of Mathematics 3(3-0)

As Needed.

Sets, logic, axiomatics, mappings and the various sub-systems of the reals for beginning graduate students.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor.

MATH 507 Linear Algebra 3(3-0)

As Needed.

Vector spaces, linear transformations, matrix representation, canonical form.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor.

MATH 521 Intermediate Analysis 3(3-0)

As Needed.

Point set theory, including the Bolzano-Weierstrass and the Heine-Borel theorems, theory of differentiation and Riemann integration, and sequences and series of functions.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor.

MATH 527 Abstract Algebra 3(3-0)

As Needed.

Groups, rings, integral domains, quotient rings, ideals, fields, homomorphisms and related topics.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor.

MATH 530 Advanced Geometry 3(3-0)

As Needed.

Foundations of geometry, geometric transformations, and applications.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor.

MATH 550 Statistical Methods 3(3-0)

As Needed.

Statistical modeling as a framework for the analysis of experimental data. Emphasis on use of statistical software. Regression, ANOVA, variance components, and chisquare tests.

Prerequisite: MATH 156.

Corequisite: None.

Registration Information: None.

MATH 556 (EN 556) Design and Analysis of Experiments 3(3-0)

Summer.

Foundations of experimental design, outline efficient methods to implement experiments, develop statistical methods to sort signal from noise, and analyze information derived from the experiment.

Prerequisite: MATH 256 and MATH 356.

Corequisite: None.

Registration Information: None.

MATH 577 Concepts in Secondary School Mathematics (1-4 V)

As Needed.

Problems of teaching secondary school mathematics; the slow learner, methods, gifted students, evaluation.

Prerequisite: None.

Corequisite: None.

Registration Information: Permission of instructor.

MATH 591 Special Topics (1-3 V)

As Needed.

Special Topics.

Prerequisite: None.

Corequisite: None.

Registration Information: Repeatable (99).

MATH 595 Independent Study (1-2 V)

As Needed.

Independent Study.

Prerequisite: None.

Corequisite: None.

Registration Information: Repeatable (99).

MATH 598 Graduate Internship (1-4 V)

As Needed.

Volunteer or paid work experience under the combined supervision of the selected organization and a faculty member.

Prerequisite: None.

Corequisite: None.

Registration Information: Graduate standing. Repeatable (99).

MATH 599 Thesis Research (1-6 V)

As Needed.

Thesis Research.

Prerequisite: None.

Corequisite: None.

Registration Information: Graduate standing. Repeatable (99).