Mathematics Courses

MATH 0800 Intermediate Algebra (3 credits)
An algebra course designed for students with an insufficient algebraic background for CS 1309, MATH 1100, MATH 1107, or MATH 1170. This course must be taken for a letter grade and, to use this course as a prerequisite for MATH 1100 or MATH 1107, a grade of C or better must be achieved, and to use this course as a prerequisite for CS 1309 or MATH 1170, a grade of B or better must be achieved. Credits are not applicable towards graduation. Topics include solving linear and quadratic equations, applications, linear inequalities, factoring, operations on polynomials, rational and radical expressions, and graphing linear equations.

MATH 1011 Mathematics for Elementary School Teachers I (3 credits)
This course meets the new BOT fundamental topics in arithmetic competencies. These topics include addition, subtraction, multiplication, and division of whole numbers; number theory related to fractions; decimals; and integers. This is the first of two mathematics courses providing the background for teaching in the elementary school. Emphasizes the use of mathematics manipulatives for modeling the basic operations. Prerequisite: Elementary education major or consent of instructor.

MATH 1013 Mathematics for Elementary School Teachers II (3 credits)
This course meets the new BOT introduction to higher mathematics competencies. These topics include geometry, discrete mathematics, probability, and statistics. This is the second of two mathematics courses providing the background for teaching in the elementary school. Emphasizes the use of mathematics manipulatives for modeling the basic concepts. Prerequisite: MATH 1011.

MATH 1100 Mathematical Reasoning (3 credits)
Mathematical reasoning and algebraic concepts applied to a selection of topics, which may include the mathematics of social choice, and the mathematics of management, geometry, and problem solving. Descriptive statistics and introductory probability and inferential statistics. A graphing calculator is required. Not open to students who have completed Math 1107 or Math 1170. Prerequisites: Two years of high school algebra and an appropriate score on the Mathematics Placement Test or completion of MATH 0800 with a grade of C or better. Liberal Education Category 4.

MATH 1107 Introduction to Mathematical Sciences (3 credits)
This course integrates the study of algebra, statistics, and computing in a laboratory-instruction environment. Topics include functions, graphical and tabular analysis, rate of change, syntax and semantics, the process of computing, data manipulation, sampling, statistical measures, basic probability, and correlation. Examples are drawn from a wide range of disciplines and content is taught within the framework of discipline-specific examples. Students learn to use the software package Microsoft Excel. Not open to students who have completed Math 1100 or Math 1170. Prerequisites: Two years of high school algebra and an appropriate score on the Mathematics Placement Test or MATH 0800 with a grade of C or better. Liberal Education Goal Area 4.

MATH 1120 Environmental Mathematics (3 credits)
This course will explore topics in which mathematics is used to investigate and inform decisions about environmental issues. Environmental issues addressed may include a study of population change, geoscience topics as related to economics and water resources, the average temperature of the earth, and data about the environment. Mathematical concepts may include iterative functions, unit conversion and statistics. Liberal Education Goal Areas 4 & 10.

MATH 1170 College Algebra (4 credits)
Problem solving with linear, quadratic, rational and absolute value equations and inequalities; function notation and inverses; graphs of relations and functions; polynomial, rational, exponential, and logarithmic functions and applications; systems of equations and inequalities, matrices. Prerequisites: Successful completion of MATH 0800 with a grade of B or better, or three years of high school mathematics (including two years of algebra) and an appropriate score on the Mathematics Placement Test. Liberal Education Goal Area 4.

MATH 1180 Trigonometry (3 credits)
Trigonometric functions, identities, equations, and applications. Prerequisites: Successful completion of Math 1170, or 3 years of high school math (including two years of algebra), and an appropriate score on the Mathematics Placement Test. Liberal Education Goal Area 4.

MATH 1470 Precalculus (5 credits)
Intended to provide the essential mathematical background needed in calculus. Topics include equation solving, functions (including polynomial, rational, exponential, logarithmic, trigonometric, and inverse trigonometric), identities, applications, and parametric equations. A graphing calculator is required. Prerequisites: Three years of high school mathematics (including two years of algebra with a half year of trigonometry strongly recommended) and an appropriate score on the Mathematics Placement Test, or completion of MATH 1170 with a grade of C or better. Liberal Education Goal Area 4.

MATH 2210 Discrete Mathematics (4 credits)
Symbolic logic, number concepts, mathematical induction, set theory, relations and functions, graphs, trees, recurrence relations, and complexity of algorithms. Prerequisites: CS 1309 or Math 1470 or higher or three years of high school mathematics (including two years of algebra) and an appropriate score on the Mathematics Placement Test. Prerequisites: CS 1309 or (CS 1107 and CS 1108) or Math 1470 or higher or three years of high school mathematics (including two years of algebra) and an appropriate score on the Mathematics Placement Test.

MATH 2471 Calculus I (5 credits)
Limits, differentiation and integration of algebraic and trigonometric functions; applications of the derivative and curve sketching; applications of integration. A graphing calculator is required. Prerequisite: An appropriate ACT math subscore or Mathematics Placement Test score or a grade of C or better in MATH 1470 or grades of C or better in both MATH 1170 and MATH 1180 or consent of instructor. Liberal Education Goal Area 4.

MATH 2472 Calculus II (5 credits)
Differentiation and integration of transcendental functions, techniques of integration, infinite sequences and series, parametric equations, polar coordinates, analytic geometry, and vectors. A graphing calculator is required. Prerequisite: A grade of C or better in MATH 2471. Liberal Education Goal Area 4.

MATH 2480 Multivariable Calculus (4 credits)
Three dimensional analytic geometry, spherical, and cylindrical coordinate systems, vectors, partial derivatives, and multiple integrals. A graphing calculator is required. Prerequisite: Successful completion of MATH 2472.

MATH 2490 Differential Equations (4 credits)
Ordinary differential equations including first order and second order linear equations, series solutions, Laplace transformations, existence and uniqueness theory, systems of linear and nonlinear equations, dynamical systems and applications. A graphing calculator is required. Prerequisite: MATH 2472.

MATH 3064 Number Concepts for Teachers (4 credits)
This course provides a background in number concepts that are pertinent to school mathematics. Topics include scientific notation, number sense, properties of integers, prime and composite numbers, divisors, GCDs, LCMs, the number of divisors, the sum of divisors, the Euclidean Algorithm, famous unsolved problems, finite mathematical systems, modular arithmetic, introductory graph theory and applications, permutations, combinations, sorting, congruences, sequences, direct and indirect proofs, mathematical induction, and traveling salesman problem and algorithms. Emphasis will be given to problem solving techniques as they relate to number concepts. Prerequisite MATH 1011 or equivalent or consent of instructor. Might not be offered every year.

MATH 3065 Mathematical Foundations of Algebra for Teachers (4 credits)
This course investigates concepts of patterns, relations, and functions. Prerequisites: MATH 1011 or equivalent or consent of instructor. Might not be offered every year.

MATH 3066 Geometry and Technology in the Mathematics Classroom (4 credits)
This course examines the concepts of patterns, shape and space; spatial sense; plane, solid, and coordinate geometry systems; generalizing geometric principals; limits, derivatives and integrals; and appropriate use of technology in the classroom. Prerequisites: MATH 1011 or equivalent or consent of instructor; (Might not be offered every year.)

MATH 3067 Data Investigations, Probability, and Statistics for Teachers (4 credits)
This course explores data investigations and concepts of randomness and uncertainty. The collection, display, analysis, and interpretation of data are studied. Additional topics include randomness, sampling, probability in simple and compound events, the prediction of outcomes using a variety of techniques, and the comparison of theoretical and empirical results of experiments. Prerequisite MATH 1011 or equivalent or consent of instructor.

MATH 3069 Mathematics and Culture (3 credits)
This course will introduce students to the relationships between mathematics and cultures and how an understanding of these relationships can increase learning and success in the mathematics classroom. The main focus of this course is on current cultures and their mathematics although some history of cultural mathematics will be covered. Cultures from around the world will be examined and students will also be given the opportunity to study cultures of particular interest to them or of particular relevance to their career as an educator. This course is designed for students studying to become and students who already are mathematics educators. Prerequisite(s): Junior-level status, graduate status, or consent of instructor.

MATH 3260 Mathematical Problem Solving (3 credits)
Investigation of problems and the process of problem solving across a variety of mathematical areas. Development and application of strategies used to solve problems with emphasis on multistep and nonroutine problems. Application of the process of mathematical modeling to real situations. Prerequisite: MATH 2210. (Might not be offered every year.)

MATH 3310 Linear Algebra (4 credits)
Systems of linear equations, linear transformations, matrix operations, vector spaces, eigenvalues and eigenvectors, orthogonality, and applications. Prerequisites: MATH 2210 and MATH 2472 or consent of instructor.

MATH 3440 Introduction to Fractals & Chaos (3 credits)
An introduction to the topics of fractal geometry, chaos, and dynamic mathematical systems. Topics included are iteration, fractals and fractal dimension, iterated function systems, Julia set, Mandelbrot set, and bifurcation. Prerequisites: MATH 2210 and MATH 2472. (Might not be offered every year.)

MATH 3560 Classical and Modern Geometry (3 credits)
Euclidean and non-Euclidean geometry, axiomatic systems, the geometry of solids, transformations, measurement, and fractal geometry. Prerequisite: MATH 2210.

MATH 3710 Mathematical Modeling (3 credits)
Mathematical modeling of applications that involve difference equations, matrices, probability, differentiation, and integration. Applications may be chosen from among the biological and p hysical sciences, economics, the social sciences, or other areas of interest. A graphing calculator is required. Prerequisite: MATH 2472. (Might not be offered every year.)

MATH 3720 Numerical Methods (3 credits)
Root finding techniques, fixed point iteration, polynomial interpolation, methods for solving linear and nonlinear systems of equations, numerical integration and differentiation, numerical solutions of differential equations, and the method of steepest descent. Prerequisite: MATH 2472.

MATH 3820 History of Mathematics (3 credits)
Historical investigation and presentation of the sources and growth of mathematical knowledge and principles, including Peano's axioms, the Axiom of Choice, and Russell's Paradox. Prerequisites: Junior or senior status and consent of the instructor. (Might not be offered every year.)

MATH 3961 Special Purpose Instruction (3 credits)
A course intended for specific groups or organizations outside the University community.

MATH 3962 Special Purpose Instruction (3 credits)
A course intended for specific groups or organizations outside the University community.

MATH 3963 Special Purpose Instruction (3 credits)
A course intended for specific groups or organizations outside the University community.

MATH 3964 Special Purpose Instruction (3 credits)
A course intended for specific groups or organizations outside the University community.

MATH 3965 Special Purpose Instruction (3 credits)
A course intended for specific groups or organizations outside the University community.

MATH 3966 Special Purpose Instruction (3 credits)
A course intended for specific groups or organizations outside the University community.

MATH 3967 Special Purpose Instruction (3 credits)
A course intended for specific groups or organizations outside the University community.

MATH 3968 Special Purpose Instruction (3 credits)
A course intended for specific groups or organizations outside the University community.

MATH 3969 Special Purpose Instruction (3 credits)
A course intended for specific groups or organizations outside the University community.

MATH 4240 Number Theory (3 credits)
Properties of integers, primes and their distribution, linear and quadratic congruences, number-theoretic functions, Diophantine equations, Fibonacci numbers, primitive roots and quadratic reciprocity. Prerequisite: MATH 2210. (Might not be offered every year.)

MATH 4350 Abstract Algebra (3 credits)
A study of abstract algebraic systems with an emphasis on the development of number systems, properties of polynomials, rings, integral domains and fields. Prerequisites: MATH 3310. (Might not be offered every year.)

MATH 4371 Modern Algebra (3 credits)
A study of abstract algebraic systems with an emphasis on groups and an introduction to rings. Prerequisite: MATH 3310.

MATH 4410 Introduction to Analysis (3 credits)
Functions, sequences, and properties of limits. Topics from calculus including continuity, differentiation, and integration. Open and closed sets, cluster points, and other topological properties. Prerequisites: MATH 2210 and MATH 2472.

MATH 4470 Advanced Calculus (3 credits)
Properties of limits, vector valued functions, infinite series, Taylor series, uniform convergence, improper integrals, convergence in the mean and Fourier series. Prerequisite: MATH 2210 and MATH 2480. (Might not be offered every year.)

MATH 4760 Topics in Applied Mathematics (3 credits)
This course focuses on an advanced topic from applied mathematics. Possible foci include operations research, cryptography, computational science, and bioinformatics. May be repeated for credit with instructor permission. Prerequisite: MATH 2472. (Might not be offered every year.)

All-University Courses

The course numbers listed below, not always included in the semester class schedule, may be registered for by consent of the advisor, instructor, or department chair, or may be assigned by the department when warranted.

Individual registration requires previous arrangement by the student and the completion of any required form or planning outline as well as any prerequisites.

1910, 2910, 3910, 4910 DIRECTED INDEPENDENT STUDY
1920, 2920, 3920, 4920 DIRECTED GROUP STUDY
1930, 2930, 3930, 4930 EXPERIMENTAL COURSE
1940, 2940, 3940, 4940 IN-SERVICE COURSE
1950, 2950, 3950, 4950 WORKSHOP, INSTITUTE, TOUR
1960, 2960, 3960, 4960 SPECIAL PURPOSE INSTRUCTION
1970, 2970, 3970, 4970 INTERNSHIP
1980, 2980, 3980, 4980 RESEARCH
1990, 2990, 3990, 4990 THESIS