MATHEMATICS (MATH)

MATH-COMP Senior Comprehensive Exam
(NULL credits) (Both Fall & Spring Semesters)
NULL

MATH-1020 Mathematics As a Liberal Art
(3 credits) (Both Fall & Spring Semesters)
Mathematics as a Liberal Art (3) (B) This course is an exploration of the mathematical techniques that can be used to solve problems in society involving quantitative reasoning. Specific topics chosen from: voting and power; division and apportionment; graph theory; and financial mathematics. Students who have successfully completed any course in mathematics above MATH-1120 cannot receive credit for MATH-1020. (MR)
General Education Categories: Mathematical Reasoning

MATH-1040 College Algebra
(3 credits) (Discretion of Department)
College Algebra (3) (D) This course covers analytical geometry and elementary functions, namely polynomial, rational, logarithmic and exponential functions. Credit is not given for both MATH-1040 and BUSI-1650.
Prerequisite(s): Approval through placement.

MATH-1110 Mathematics for Elem Teachers I
(4 credits) (Both Fall & Spring Semesters)
Mathematics for Elementary Teachers I (4) (B) The course examines the structures and properties of mathematics while focusing on the development of problem-solving skills. Emphasis is placed on acquiring an understanding of basic mathematics including the base ten number system, fractions, decimals, arithmetic operations, and different ways to represent these numbers and operations.
Prerequisite(s): Intend to major in Elementary Education.

MATH-1120 Mathematics for Elem Teachers II
(3 credits) (Both Fall & Spring Semesters)
Mathematics for Elementary Teachers II (3) (B) This course, a continuation of MATH-1110, examines the structures and properties of mathematics while focusing on the development of problem-solving skills. Emphasis is placed on acquiring an understanding of basic mathematical concepts including proportional reasoning, algebra, geometry, measurement, probability, and statistics, and different ways to represent relevant concepts and procedures. (MR)
Prerequisite(s): MATH-1110.
General Education Categories: Mathematical Reasoning

MATH-1130 Math for Middle School Teachers
(1 credit) (Both Fall & Spring Semesters)
Mathematics for Middle School Teachers (1) (B) This course, a continuation of MATH-1120, examines the structures and properties of mathematics while focusing on the development of problem-solving skills. Emphasis is placed on acquiring an understanding of intermediate mathematical concepts including real numbers, algebra, functions, similarity, congruence, probability, and statistics, and different ways to represent relevant concepts and procedures.
Prerequisite(s): MATH-1120.

MATH-1220 Introductory Statistics
(4 credits) (Both Fall & Spring Semesters)
Introductory Statistics (4) (B) This course is designed to acquaint students with how statistics is applied in a wide variety of disciplines. Students are introduced to fundamental concepts and tools for collecting, analyzing, and drawing conclusions from data. Topics discussed include displaying and describing data, the normal distribution, regression, probability, statistical inference, confidence intervals, and hypothesis tests with applications in the real world. Note: Credit will not be given if the student has taken BUSI-2650. (MR)
General Education Categories: Mathematical Reasoning

MATH-1250 Pre-Calculus
(4 credits) (Both Fall & Spring Semesters)
Pre-Calculus (4) (D) This course is designed for the student with good algebra skills but lacking adequate preparation to enter calculus. The course focus is on functions modeling change. Stress is placed on conceptual understanding and multiple ways of representing mathematical ideas. The goal is to provide the students with a clear understanding of the function concept and the use of functional notation. Exponential, logarithmic, trigonometric, polynomial and rational functions are covered. (MR)
Prerequisite(s): Intend to take MATH-1300, but lack necessary skills.
General Education Categories: Mathematical Reasoning

MATH-1300 Calculus I
(4 credits) (Both Fall & Spring Semesters)
Calculus I (4) (B) This course covers functions, analytical geometry, limits and continuity, differential and integral calculus of algebraic and transcendental functions and applications of differential calculus. (MR)
Prerequisite(s): Grade of C or better in PreCalculus or equivalent or placement exam.
General Education Categories: Mathematical Reasoning

MATH-1350 Calculus II
(4 credits) (Both Fall & Spring Semesters)
Calculus II (4) (B) This course covers further integration techniques and applications, limits and approximations, sequences, series and improper integrals, and parametric equations. (MR)
Prerequisite(s): MATH-1300.
General Education Categories: Mathematical Reasoning

MATH-2300 Calculus III
(4 credits) (Both Fall & Spring Semesters)
Calculus III (4) (B) This course covers geometry of n-space, functions of several variables, limits and continuity, differential and integral calculus of functions of several variables, and vector analysis.
Prerequisite(s): MATH-1350.

MATH-2500 Linear Algebra
(3 credits) (Spring Semester)
Linear Algebra (3) (S) This course covers linear equations and matrices, vector spaces, determinants, linear transformations and matrices, characteristic equations, eigenvectors and eigenvalues, and related topics.
Prerequisite(s): MATH-1300.

MATH-2550 Discrete Mathematical Structures I
(3 credits) (Fall Semester)
Discrete Mathematical Structures I (3) (F) This course introduces students to non-continuous models that are important in the application of mathematics to various disciplines. The principal topics treated are mathematical logic and set language, functions, Boolean expressions and combinational circuitry, counting principles, graph theory, and an introduction to elementary number theory. Attention is given to various methods of proof, in particular to mathematical induction. Placement into this class is by approval. (MR)
General Education Categories: Mathematical Reasoning

MATH-2900 History of Mathematics
(2 credits) (Spring Semester)
History of Mathematics (2) (S) This course is an introduction to the history of mathematics designed for mathematics and mathematics education majors. Emphasis is placed on the historical development of those topics in mathematics that appear in the high school and undergraduate curriculum.
Prerequisite(s): Sophomore standing and MATH-1300.

MATH-3100 Differential Equations
(3 credits) (Both Fall & Spring Semesters)
Differential Equations (3) (B) This course covers first- and second-order differential equations, including linear and nonlinear equations, Laplace transforms, series solutions, and numerical techniques.
Prerequisite(s): MATH-2300.

MATH-3200 Probability & Statistics
(3 credits) (Fall Semester)
Probability and Statistics (3) (F) This course covers probability and statistical inference, discrete and continuous random variables, distributions, hypothesis testing, correlation and regression, testing for goodness of fit.
Prerequisite(s): MATH-2300.

MATH-3300 Numerical Computation
(3 credits) (Discretion of Department)
Numerical Computation (3) (D) This course covers finite differences, numerical differentiation and integration, linear systems and matrices, difference equations, error analysis and related topics.
Prerequisite(s): MATH-1350, and one of CSCI-1140, CSCI-2300 or ENGR-2000.

MATH-3400 Introduction to Cryptography
(3 credits) (Spring Semester)
Introduction to Cryptography (3) (S) This course provides students with an introduction to the mathematical theory of cryptography, the practice of encoding information for the purpose of keeping it secret. Topics include classical, stream, and block ciphers, the Data Encryption Standard (DES), the Advanced Encryption Standard (AES), public-key cryptography, and methods of cryptanalysis. The course will touch on multiple areas of mathematics as needed, including matrix algebra, modular arithmetic, finite fields, and elementary probability theory.
Prerequisite(s): MATH-2550 or permission of instructor.

MATH-3600 Modern Algebra I
(3 credits) (Fall Semester)
Modern Algebra I (3) (F) This two-semester sequence of courses provides an in-depth introduction to some of the structures and techniques of modern algebra. The principal subjects are the theory of groups, rings, and fields. Specific examples of these will be discussed. For each structure we will discuss the appropriate substructure, quotient structure, and other topics such as homomorphisms. Current applications of algebra are also discussed.
Prerequisite(s): MATH-2500 and MATH-2550.

MATH-3610 Modern Algebra II
(3 credits) (Spring Semester)
Modern Algebra II (3) (S) This two-semester sequence of courses provides an in-depth introduction to some of the structures and techniques of modern algebra. The principal subjects are the theory of groups, rings, and fields. Specific examples of these will be discussed. For each structure we will discuss the appropriate substructure, quotient structure, and other topics such as homomorphisms. Current applications of algebra are also discussed.
Prerequisite(s): MATH-2500 and MATH-2550.

MATH-4457 Secondary School Math Curr & Materials
(4 credits) (Fall Semester)
Secondary School Mathematics Curriculum and Methodology (4) (F) This course is designed to acquaint the future mathematics teacher with an overview of the methodology of teaching mathematics at the middle and secondary school level. Topics include but are not limited to planning and teaching effective lessons, assessment, and the use of technology in instruction. Available resources are examined in an effort to generate an enthusiastic and creative approach to teaching. Application of concepts in twenty hours of field experience is required. (WC)
Prerequisite(s): Enrollment in Secondary Mathematics Education and EDUC-3357.
General Education Categories: Written Communication

MATH-4600 Modern Geometries
(3 credits) (Fall Semester)
Modern Geometries (3) (F) This course covers foundations and axiomatics, Euclidean and non-Euclidean geometries, transformation geometry, projective geometry, and the geometry of inversion.
Prerequisite(s): MATH-2500 and MATH-2550.

MATH-4700 Complex Analysis
(3 credits) (Spring Semester)
Complex Anaysis (3) (S) This course studies functions involving complex numbers and mappings in the complex plane. The topics include computation of limits, derivatives, line integrals, and possibly residues of complex functions, including complex exponential and logarithmic functions. Non computational concepts include analyticity and branch cuts. Optional topics include sequences and series of complex numbers, conformal mappings, and applications outside pure mathematics.
Prerequisite(s): MATH-2300.

MATH-4800 Introduction to Real Analysis
(3 credits) (Spring Semester)
Introduction to Real Analysis (3) (S) This course covers the real number system, metric spaces, continuity, sequences and series, differentiation, integration, sequences and series of functions.
Prerequisite(s): MATH-2300 and MATH-2550.

MATH-4930 Directed Research
(2 credits) (Fall Semester)
Directed Research (2) (F) (OC, VC, WC)
Prerequisite(s): Junior or senior mathematics major and permission of the department chair.
General Education Categories: Oral Communication, Visual Communication, Written Communication