

# MATHEMATICS (MATH)

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## **MATH 088 Beginning Algebra 3 Credit Hours (3,0)**

A review of integer and rational number operations, introduction to algebra, algebraic expressions and solving of elementary equations and inequalities will be covered in this class. Manipulation and graphing of equations in two variables, as well as solving systems of equations in two variables. Multiplying, factoring and manipulating polynomial expressions. Credit in this course does not apply toward graduation. Students who are enrolled in MATH088 are encouraged to also enroll in MATH107 concurrently.

**Prerequisite(s):** none

## **MATH 102 Intermediate Algebra 3 Credit Hours (3,0)**

Algebra for students who have not had second-level high school algebra or who need a refresher course in that level of algebra. Quadratic equations, radical and rational expressions and equations, exponential and logarithmic functions will be studied. Students who are enrolled in MATH088 are encouraged to also enroll in MATH107 concurrently. This course will not count toward a major or minor in mathematics.

**Prerequisite(s):** MATH088 or equivalent/satisfactory score on ACT/SAT or Placement Exam

## **MATH 103 Number Sys/Prob Solv Elem Teac 4 Credit Hours (3,2)**

General notions of problem solving and number theory for elementary teachers including sets, functions, numeration systems, and properties and operations of whole numbers, integers, fractions and decimals, and proportional reasoning.

**Prerequisite(s):** Equivalent/satisfactory score on ACT or Placement Exam, or MATH102 with a grade of C (2.00) or better

## **MATH 104 Geometry/Masurement Elem Teac 4 Credit Hours (3,2)**

Basic notions of geometry for elementary teachers including constructions, congruence and similarity, motion geometry, symmetry and tessellations. Concepts of measurement, coordinate geometry, probability and data analysis.

**Prerequisite(s):** Equivalent/satisfactory score on ACT or Placement Exam, or MATH102 with a grade of C (2.00) or better

## **MATH 107 Building Mathematic Confidence 1 Credit Hour (1,0)**

Students who are enrolled in MATH088 or MATH102 are strongly encouraged to enroll in this class. In this class we will discuss phobias about mathematics and build our confidence about our mathematical abilities through discussion and active problem solving without the constraints of a traditional mathematics course. This course will be a suggested corequisite with MATH088 or MATH102. Course may not be repeated.

## **MATH 110 Explorations in Mathematics 3 Credit Hours (3,0)**

A discovery course in mathematics which explores the varied relationships of mathematics to society and the natural world through application and enrichment. A study of functions and statistics is a core component of the course. This course satisfies the general education mathematics requirement. It will not count toward a major or minor in mathematics.

**Prerequisite(s):** MATH088 or equivalent score on ACT or Placement Exam

## **MATH 111 College Algebra 3 Credit Hours (3,0)**

This course is a study of families of functions through formulas, tables, graphs and words, emphasizing applications in business, life and social science. The function families include linear, polynomial, rational, exponential, logarithmic and power functions. Within these families, topics include problem solving, model creation, solving equations, systems of equations and inequalities, rates of change, graphing, analysis, and interpretation. This course will not count toward a major or minor in mathematics.

**Prerequisite(s):** Two years of high school algebra and satisfactory achievement on the mathematics placement exam or MATH102 with a grade of C or better; high school plane geometry also recommended

## **MATH 112 Calculus Business/Life Science 4 Credit Hours (4,0)**

Limits, differentiation, applications of the derivative, integration, application of the definite integral, techniques of integration. Calculus of exponential and logarithmic functions, elementary differential equations, functions of several variables. This course will not count towards a major or minor in mathematics.

**Prerequisite(s):** MATH111 with a grade of C or better

## **MATH 131 College Trigonometry 3 Credit Hours (3,0)**

Basic theory of trigonometric functions and inverse trigonometric functions. Applications include trigonometric equations, plane trigonometry, vectors and complex numbers. Introduction to conic sections. Study of exponential functions and their connection to trigonometric functions, logarithmic functions and applications.

**Prerequisite(s):** Two years of high school algebra and equivalent/satisfactory score on ACT, SAT, COMPASS Test or Placement Exam, or MATH102 with a grade of C or better; One half-year of high school trigonometry with a grade of C or better is strongly recommended

## **MATH 151 Calculus I 4 Credit Hours (4,0)**

Limits, continuity and inverse functions. Logarithmic and exponential functions. Differentiation and applications of the derivative. L'Hopital's rule. Inverse trigonometric functions. Integration and the definite integral.

**Prerequisite(s):** high school mathematics that includes two years of algebra, one year of plane geometry and one-half year of trigonometry and equivalent/satisfactory score on SAT, ACT or Placement Exam or both MATH111 and MATH131 with a grade of C or better

## **MATH 152 Calculus II 4 Credit Hours (4,0)**

Applications of the definite integral. Techniques of integration and improper integrals. Infinite series. Conic sections, polar coordinates and parametric equations.

**Prerequisite(s):** MATH151 with a grade of C or better

## **MATH 207 Prin of Statistical Methods 3 Credit Hours (3,0)**

Descriptive statistics, probability distributions (including normal, binomial and chi-square), techniques of statistical inference including tests of hypotheses and selected nonparametric tests. (This course is a survey of elementary statistical concepts.) This course will not count toward a major in mathematics.

**Prerequisite(s):** MATH088 or equivalent/satisfactory score on ACT or Placement Exam

## **MATH 215 Fund Concepts of Mathematics 4 Credit Hours (4,0)**

Elements of set theory, set algebra, cardinality, logic, mathematical induction, methods of proof, functions, relations, equivalence and recurrence relations.

**Prerequisite(s):** MATH151 or MATH112 with a grade of C or better

**MATH 216 Discrete Math/Problem Solving 3 Credit Hours (3,0)**

Selected topics from discrete mathematics including fundamental counting principles, recurrence relations and an introduction to graph theory. A strong emphasis is placed on fundamental problem-solving techniques.

**Prerequisite(s):** MATH215 with a grade of C or better

**MATH 251 Calculus III 4 Credit Hours (4,0)**

Three-dimensional space, vectors, vector-valued functions, partial differentiation, multiple integration, topics in vector calculus.

**Prerequisite(s):** MATH152 with a grade of C or better

**MATH 261 Intro to Numerical Methods 3 Credit Hours (3,0)**

Floating point representation of numbers and floating point arithmetic. Survey of numerical methods for solving a wide variety of common mathematical problems, including solution of a single non-linear equation, solution of systems of linear and nonlinear equations, matrix factorization, numerical integration, function approximation, and interpolation. Emphasis will be on the computer implementation of common algorithms for solving these problems. On demand

**Prerequisite(s):** CSCI105 or CSCI121 with a grade of C or better and MATH151 or MATH112 with a grade of C or better

**MATH 290 Independent Study: Mathematics 1-4 Credit Hours**

Special studies and/or research in mathematics for individuals or small seminar groups. Course content to be arranged with instructor and with approval of the department head. This course may be repeated for a maximum of eight credits. (1-4, 0) 1-4

**Prerequisite(s):** Sophomore standing or higher and permission of instructor

**MATH 305 Linear Algebra 3 Credit Hours (3,0)**

An introduction to matrix algebra, vector spaces and linear transformation, including applications to the natural and social sciences.

**Prerequisite(s):** MATH112 or MATH151 with a grade of C or better

**MATH 308 Probability and Math Stats 3 Credit Hours (3,0)**

An introductory course in probability and mathematical statistics. Probability, probability distributions, mathematical expectation, moment generating functions and the Central Limit Theorem.

**Prerequisite(s):** MATH 152 with a grade of C or better

**MATH 309 Applied Statistics 4 Credit Hours (4,0)**

A continuation of MATH308 including estimation of parameters, testing hypotheses, nonparametric methods, analysis of variance, multiple regression and an introduction to statistical software packages.

**Prerequisite(s):** MATH308 with a grade of C or better

**MATH 310 Differential Equations 3 Credit Hours (3,0)**

Differential equations of first order, linear differential equations of second and higher orders, including Laplace transformation. Introduction to power series methods, applications.

**Prerequisite(s):** MATH152 with a grade of C or better

**MATH 321 History of Mathematics 3 Credit Hours (3,0)**

Selected topics in the development of mathematics from the time of the ancient Babylonians and Egyptians to the 20th century.

**Prerequisite(s):** MATH112 or 151 with a grade of C or better, and MATH215 with a grade of C or better

**MATH 325 College Geometry 3 Credit Hours (2,2)**

Selected topics in geometry, including some or all of the following: Modern elementary geometry, transformations, Euclidean constructions, dissection theory, projective geometry, introduction to non-Euclidean geometry, and problems in foundations of geometry.

**Prerequisite(s):** MATH215 with a grade of C or better

**MATH 341 Abstract Algebra I 3 Credit Hours (3,0)**

An introduction to the theory of abstract algebra. Topics include groups, rings, fields, and fundamental homomorphism theorems.

**Prerequisite(s):** MATH215 with a grade of C or better

**MATH 342 Abstract Algebra II 3 Credit Hours (3,0)**

A continuation of MATH341 including rings, integral domains, ideals, quotient rings, the natural homomorphism, fields and polynomial rings.

On Demand

**Prerequisite(s):** MATH341

**MATH 351 Graph Theory 3 Credit Hours (3,0)**

Selected topics in graph theory, including connectivity, matchings, edge and vertex colorings, networks and tournaments. Alternate Years

**Prerequisite(s):** MATH215 with a grade of C or better

**MATH 390 Directed Study in [Discipline] 3 Credit Hours (3,0)**

Directed study of a junior or senior level topic in mathematics. This course may be repeated up to 12 credits.

**Prerequisite(s):** Permission of instructor

**MATH 401 Mathematical Modeling 3 Credit Hours (3,0)**

Selected applications of mathematics in such areas as biology, economics, social science and engineering are discussed. The construction of a mathematical model used to study a real situation will be stressed, as well as interpretation of mathematical results in that context.

**Prerequisite(s):** junior/senior standing, a course in computer programming, and mathematical maturity at the level of MATH305, MATH308 or MATH310 with a minimum grade of C

**MATH 411 Advanced Topics in Calculus 3 Credit Hours (3,0)**

Advanced topics in calculus, beyond the level of Calculus III and Differential Equations, to be announced by the instructor. Topics may include but are not limited to Fourier Series, Partial Differential Equations, or Complex Variables. Applications to the physical sciences will be included. Alternate Years.

**Prerequisite(s):** MATH251 and MATH310 with a grade of C or better

**MATH 413 Intro to Complex Analysis 3 Credit Hours (3,0)**

The calculus of functions of a complex variable, algebra and geometry of complex numbers, elementary functions, limits, derivatives, Cauchy-Riemann equations, integrals, Cauchy integral theorem, series, singularities, residue theorem. On Demand

**Prerequisite(s):** MATH251

**MATH 421 Real Analysis 3 Credit Hours (3,0)**

An examination of some of the foundations of the calculus, including basic topology of the real line, limits, continuity, metric spaces, function spaces, some uniformity concepts. On Demand

**Prerequisite(s):** MATH215 and 251 with a minimum grade of C

**MATH 490 Ind Res Topics in Mathematics 1-4 Credit Hours (1-4,0)**

Special studies and/or research in mathematics for individuals or small seminar groups. Course content to be arranged with instructor and with approval of the department head. This course may be repeated for a maximum of nine credits.

**Prerequisite(s):** Junior standing or higher and Permission of Instructor