

# MATHEMATICS (MTH)

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## **MTH 001 Adjust My Placement (AMP) (1 Credit)**

Provides a structured setting to refresh and review math skills. Participate in problem-solving activities designed to strengthen critical thinking skills. Provides an opportunity for students to be successful in a higher-level math class than they originally placed. Math advising is also part of this course. Intended for students to strengthen previously-learned mathematical skills and problem-solving abilities. To receive the maximum benefit of this course, it is important to enroll in a math course the term immediately following. Meets twice a week for 7 weeks, beginning the second week of the term.

## **MTH 011 Precalculus I: Functions Seminar (2 Credits)**

**Corequisites:** MTH 111Z.

**Recommended Preparation:** MTH 095 or minimum placement Math Level 18.

This support course focuses on the foundational skills, concepts, and communication needed to be persistent and successful in MTH 111Z (Precalculus I: Functions). Students will receive appropriate support as needed in algebra, functions, problem solving, graphing, technology, and study skills in an interactive setting. P/NP grading.

## **MTH 015 Basic Mathematics (4 Credits)**

**Recommended preparation:** Minimum placement Math Level 4.

Introduces mathematics and its application, explains language and symbols used in math, develops concepts in whole numbers, fractions, decimals, percents, ratio, proportion, and integers, while emphasizing study and learning skills necessary for success in math courses and overcoming anxiety toward math.

## **MTH 029 Fraction Review Workshop (2 Credits)**

Provides a concentrated experience for students needing a review of fractions and associated number theory skills. This course is not a replacement for students who place into or need to take MTH 015. May be taken concurrently with another math class. P/NP grading.

## **MTH 060 Beginning Algebra (4 Credits)**

**Recommended preparation:** MTH 015 or higher or minimum placement Math Level 7.

Introduces algebra, integers, rational and real numbers, algebraic expressions, linear equations in one and two variables, and graphical representations with a focus on modeling and applications.

## **MTH 095 Intermediate Algebra (4 Credits)**

**Recommended preparation:** MTH 060 or minimum placement Math Level 10.

Continues the algebra foundation necessary to study college level algebra. Includes polynomial, exponential, radical, and rational expressions. Linear and quadratic functions will be used to model situations and interpret data. An understanding of the connection between narrative, numeric, algebraic, and graphical representations of functions is emphasized. Graphing by hand and using technology are implemented as appropriate. Uses graphing technology.

## **MTH 098 Math Literacy (4 Credits)**

**Recommended preparation:** MTH 015 or minimum placement in Math Level 7.

Builds on MTH 015 to present mathematics in the context of "math you encounter in your daily life". Introduces and applies pattern recognition, estimation and number sense, working with units, negative numbers, order of operations, and using basic equations and formulas. Explores how to clearly communicate arguments supported by quantitative evidence using words, tables, graphs, and when appropriate, equations and mathematical models.

## **MTH 099 Selected Topics: Mathematics (1-4 Credits)**

Offers selected topics in mathematics for courses generally available only once. Topics and credits to be arranged. P/NP grading.

## **MTH 102 Applied Technical Mathematics (4 Credits)**

**Prerequisites:** MTH 060 or higher or minimum placement Math Level 10. Presents algebraic, geometric, and trigonometric concepts in a practical and applied workplace problem-solving context. Includes mathematical operations with real numbers, measurement, ratios, proportions, percentages, dimensional analysis, order of operations, solving equations numerically and symbolically, right triangle trigonometry, area, perimeter, surface area, volume, and weights.

## **MTH 105Z Math in Society (4 Credits)**

**Recommended preparation:** MTH 095 or MTH 098 or higher or minimum placement Math level 14.

An exploration of present-day applications of mathematics focused on developing numeracy. Major topics include quantitative reasoning and problem-solving strategies, probability and statistics, and financial mathematics; these topics are to be weighted approximately equally. This course emphasizes mathematical literacy and communication, relevant everyday applications, and the appropriate use of current technology.

## **MTH 111Z Precalculus I: Functions (4 Credits)**

**Recommended preparation:** MTH 095 or minimum placement Math Level 18.

A course primarily designed for students preparing for trigonometry or calculus. This course focuses on functions and their properties, including polynomial, rational, exponential, logarithmic, piecewise-defined, and inverse functions. These topics will be explored symbolically, numerically, and graphically in real life applications and interpreted in context. This course emphasizes skill building, problem solving, modeling, reasoning, communication, connections with other disciplines, and the appropriate use of present-day technology.

## **MTH 112Z Precalculus II: Trigonometry (4 Credits)**

**Recommended preparation:** MTH 111Z or minimum placement Math Level 20.

A course primarily designed for students preparing for calculus and related disciplines. This course explores trigonometric functions and their applications as well as the language and measurement of angles, triangles, circles, and vectors. These topics will be explored symbolically, numerically, and graphically in real-life applications and interpreted in context. This course emphasizes skill building, problem solving, modeling, reasoning, communication, connections with other disciplines, and the appropriate use of present-day technology.

## **MTH 188 Special Studies: Mathematics (1-4 Credits)**

Explores topics of current interest in the mathematics discipline.

## **MTH 199 Selected Topics: Mathematics (1-4 Credits)**

This course is in development.

**MTH 211 Fundamentals of Elementary Mathematics I (4 Credits)**

**Recommended preparation:** MTH 095 or minimum placement Math Level 18.

Introduces problem solving, sets, natural and whole numbers, number theory and fractions. First term of a sequence for students planning to become elementary teachers but open to any students wanting to study the foundations of mathematics.

**MTH 212 Fundamentals of Elementary Mathematics II (4 Credits)**

**Recommended preparation:** MTH 211.

Covers decimals, percents, ratio and proportion, integers, rational and real numbers, and statistics and probability. Second term of a sequence for students planning to become elementary teachers but open to any student wanting to study the foundations of mathematics.

**MTH 213 Fundamentals of Elementary Mathematics III (4 Credits)**

**Recommended preparation:** MTH 211.

Covers geometric shapes, measurement, congruence and similarity, and coordinate and transformational geometry. Third term of a sequence for students planning to become elementary teachers but open to any student wanting to study the foundations of mathematics.

**MTH 231 Discrete Mathematics (4 Credits)**

**Recommended preparation:** MTH 112Z or minimum placement Math Level 22.

Examines applied, real-world and theoretical mathematical implications of the mathematical concepts elementary logic and set theory, functions, direct proof techniques, contradiction and contraposition, mathematical induction and recursion, elementary combinatorics, basic graph theory, minimal spanning trees. Expands and explores symbolic, numerical, and graphical representations of mathematical concepts. Emphasizes solving problems symbolically, numerically, and graphically and understanding the connections among these methods in interpreting and analyzing results.

**MTH 241 Calculus for Management/Social Science (4 Credits)**

**Recommended preparation:** MTH 111Z or minimum placement Math Level 20.

Introduces basic concepts of differential and integral calculus for students majoring in management and social science. Includes elementary differential and integral calculus of polynomial, logarithmic, and exponential functions and their applications to business, management, and social sciences. Uses graphing technology.

**MTH 244 Introduction to Probability and Statistics 2 (4 Credits)**

**Prerequisites:** STAT 243Z.

Introduces methods of inferential statistical analysis. Includes confidence intervals, hypothesis testing, linear correlation and regression, chi-square tests, and analysis of variance (ANOVA). May cover nonparametric methods. Uses spreadsheet and graphing technology.

**MTH 251 Calculus I (4 Credits)**

**Recommended preparation:** MTH 112Z (or higher) or minimum placement Math Level 22.

Introduces concepts of differential calculus for science, mathematics and engineering students. Includes limits and continuity; the derivative; rates of change; derivatives of polynomial, rational and trigonometric, log, and exponential functions; applications including related rates and optimization; and antiderivatives. Uses graphing technology.

**MTH 252 Calculus II (4 Credits)**

**Recommended preparation:** MTH 251 or minimum placement Math Level 24.

Introduces concepts of integral calculus to science, mathematics and engineering students. Includes antidifferentiation, the Fundamental Theorem of Calculus, integration techniques, numerical methods, improper integrals and mathematical modeling with applications to geometry, physics, economics and population dynamics. Uses graphing technology.

**MTH 253 Calculus III (4 Credits)**

**Recommended preparation:** MTH 252.

Introduces additional calculus concepts to science, mathematics, and engineering students. Includes selected topics in linear algebra, parametric and polar functions, applications of calculus to parametric and polar functions, infinite series, and Taylor series and polynomials. Uses graphing technology.

**MTH 254 Vector Calculus I (4 Credits)**

**Recommended preparation:** MTH 253.

Introduces concepts of vector calculus to science and engineering students. Includes vectors and vector functions, parametric curves, functions of several variables, partial derivatives, gradients, directional derivatives and optimization problems. Uses graphing technology.

**MTH 255 Vector Calculus II (4 Credits)**

**Recommended preparation:** MTH 254.

Continues the study of vector analysis for science and engineering students. Includes double and triple integrals with applications to area, volume, and center of mass; introduction to vector analysis including divergence, curl, line integrals and work, surface integrals; conservative fields and the theorems of Green and Stokes. Uses graphing technology.

**MTH 256 Applied Differential Equations (4 Credits)**

**Recommended preparation:** MTH 253 or MTH 261A.

Introduces the application of differential equations for science, technology, engineering and mathematics (STEM) students. Includes solutions to first- and second-order linear and nonlinear equations, systems of linear first-order differential equations and applications appropriate for science and engineering; numerical, graphical, series and analytical solutions are covered.

**MTH 261A Introduction to Linear Algebra (2 Credits)**

**Recommended preparation:** MTH 252.

Provides an introduction to linear algebra concepts for science, math, and engineering majors. Topics include vectors, matrices, systematic solution to linear systems, determinants, linear dependence and independence, linear transformations, and eigenvalues and eigenvectors.

**MTH 280 Co-op Work Experience Mathematics (1-4 Credits)**

**Prerequisites:** Instructor approval.

Provides experience in which students apply previous classroom learning in an occupational setting. Credits depend on the number of hours worked. P/NP grading.

**MTH 288 Special Studies: Mathematics (1-4 Credits)**

Explores topics of current interest in the mathematics discipline.

**MTH 298 Independent Study: Mathematics (1-4 Credits)**

**Prerequisites:** Instructor approval.

**Recommended preparation:** prior coursework in the discipline.

Individualized, advanced study to focus on outcomes not addressed in existing courses or of special interest to a student. P/NP grading.

**MTH 299 Selected Topics: Mathematics (1-4 Credits)**

Provides a learning experience in math not currently available; this course is in development to be proposed as a permanent course.