

# Mathematics (MAT)

## (Mathematics Department)

### **MAT 010—Fundamentals of Arithmetic**

3 units (Fall/Spring/Summer)

Designed for students who need a review of arithmetic, including addition, subtraction, multiplication and division of whole numbers, fractions, mixed numbers, decimals, and percents. Areas of geometric figures are investigated. The course is both intended to alleviate mathematics anxiety and avoidance and to develop self-confidence to continue study in mathematics.

Prerequisite: Placement in MAT 010

*\*not applicable to associate degrees or other certificate programs*

### **MAT 020—Fundamentals of Algebra**

3 units (Fall/Spring/Summer)

Designed for students who need a review of beginning algebra. Topics include addition, subtraction, multiplication, and division of signed numbers, solutions of linear equations and inequalities, exponents, combining polynomials, literal equations, and applications of linear equations. Students learn to develop skills in reading of mathematics.

Prerequisite: Successful completion (DVP) of MAT 010 or placement in MAT 020

*\*not applicable to associate degrees or other certificate programs*

### **MAT 030—Fundamentals of Mathematical Reasoning**

4 units (Fall/Spring)

Designed for students who are non-STEM majors. This course focuses on math for everyday life. Topics include fluency with numbers, proportional reasoning, data interpretation, algebraic reasoning, modeling, and communicating quantitative information. Mathematical concepts are investigated through group problems and class discussions based on real-life contexts of citizenship, personal finances, and medical literacy. This course is not intended for students who plan to major in math, science, engineering, technology or business. This course does NOT satisfy the prerequisite for MAT 101.

Prerequisite: Successful completion (DVP) of MAT 010 or placement in MAT 020 or MAT 030

*\*not applicable to associate degrees or other certificate programs*

### **MAT 040—Beginning Algebra**

4 units (Fall/Spring/Summer)

This course is designed for students who need a review of arithmetic and basic algebra. Topics include operations on rational numbers, exponents, order of operations, evaluating and simplifying variable expressions, solving linear equations and inequalities, analyzing linear equations with two variables, and solving systems of linear equations. This course is intended to help students alleviate mathematics anxiety and develop self-confidence to continue studying mathematics.

Prerequisite: Placement of MAT 040

Note:

*\*not applicable to associate degrees or other certificate programs*

### **MAT 092—Corequisite Support Module for Intermediate Algebra**

2 units (Fall/Spring/Summer)

This is a mandatory corequisite course in conjunction with MAT 102 (Intermediate Algebra) for students who place into MAT 102 with corequisite support or who successfully complete MAT 040. This course is designed to provide the necessary support for students to be successful in MAT 102. Topics include operations on rational numbers, evaluating and simplifying variable expressions, solving linear equations, polynomial operations, and exponent rules.

Prerequisite: Successful completion of MAT 040 or placement into MAT 092 or higher \*Passing MAT 092 does not guarantee that a student will also pass MAT 102. Corequisites:

Corequisite: MAT 102

*\*not applicable to associate degrees or other certificate programs*

### **MAT 094—Corequisite Support Module for Introduction to Statistics**

1 unit (Fall/Spring)

This is a mandatory corequisite course in conjunction with MAT 120 (Introduction to Statistics) for students who place into MAT 120 with corequisite support or who successfully complete MAT 040 or MAT 030. This course is designed to provide the necessary support for students to be successful in MAT 120. Topics include translating verbal phrases into variable expressions, operations on real numbers, study skills, and supplemental instruction in statistics

Corequisite: MAT 120

*\*not applicable to associate degrees or other certificate programs Prerequisites: Successful completion (DVP) of MAT 040 or MAT 030 or placement into MAT 094 or higher \* Passing MAT 094 does not guarantee that a student will also pass MAT 120 Corequisites:*

## **MAT 101—Elementary Algebra**

3 cr. (Fall/Spring/Summer)

An elementary algebra course. Topics include operations on polynomials and rational expressions, laws of exponents, factoring, graphing of linear equations and inequalities, and systems of equations. A knowledge of operations on signed numbers and solutions to linear equations is required. Emphasis is placed on developing the skills necessary for further study of algebra.

Prerequisite: Successful completion (DVP) of MAT 020 or placement in MAT 101

Note: Not open to students who have successfully completed MAT 102 or higher numbered courses. MAT 101 may only be used as elective credit or liberal arts elective credit in the Liberal Arts A.A. degree, elective credit in the Liberal Arts A.S. and Individual Studies A.S. degrees.

## **MAT 102—Intermediate Algebra**

3 cr. (Fall/Spring/Summer)

This course is designed for students who need to develop the skills necessary for further study of algebra. Topics include factoring, rational expressions, radical expressions, complex numbers, and quadratic equations and applications. This course is intended for students who are on a STEM path. (GE 1)

Prerequisite: C or better in MAT 101 or successful completion (DVP) of MAT 040 or MAT 092 or placement into MAT 092 or placement into MAT 102. Students who have successfully completed MAT 040 or who place into MAT 092 are eligible to take MAT 102, but must also take the mandatory MAT 092 corequisite course Not open to students who have successfully completed MAT 121 or higher numbered courses.

*\*MAT 102 may only be used as math credit in the A.A. degree and only as elective credit in the A.S. or A.S. Individual Studies degrees*

## **MAT 107—Technical Math**

3 cr. (Fall)

A basic operations approach to the study of algebra and trigonometry for students entering technical programs. Scientific calculators are used for applied problem solutions.

Prerequisite: C or better in MAT 101

## **MAT 111—Foundations of Elementary School Mathematics**

3 cr. (Fall/Spring)

This course is designed to provide a clear understanding of and ways of communicating the major concepts and skills taught in elementary school math. Concepts covered include problem solving; set theory; logic; different base number systems; whole number integers, rational numbers, and real numbers; number theory; statistics; and probability. This course is only for students interested in teaching elementary school. (GE 1)

Prerequisite: C or better in MAT 102 or placement in MAT 121 or higher

## **MAT 113—Mathematics for the Liberal Arts**

3 cr. (Spring)

A liberal arts mathematics survey course. Topics are drawn from the areas of sets, logic, rational and real numbers, numeration systems, statistics, probability, patterns of numbers, and modular systems. (GE 1)

Prerequisite: Successful completion (DVP) of MAT 030 or MAT 040, C or better in MAT 101 or placement in MAT 092 in higher

Note: This course is not recommended for students who desire to progress towards the study of calculus. MAT 113 does not fulfill the 6-8 credits in math required in the A.S. degree.

## **MAT 120—Introduction to Statistics**

3 cr. (Fall/Spring/Summer)

This course examines the general elements and principles of statistics used in the fields of education, consumerism, quality control, allied health, physical sciences, and social sciences. Course is broken into two parts; descriptive statistics and inferential statistics. Topics include: methods of summarizing and presenting data; measures of center, spread, and position; probability; binomial probability distribution; normal probability distribution; t-test; chi-square test; confidence intervals, hypothesis testing; and linear regression. (GE 1)

Prerequisite: Successful completion (DVP) of MAT 030 or MAT 040 or MAT 094 or successful completion (D- or higher) of MAT 102 or C or better in MAT 101 or placement into MAT 102 or higher or placement into MAT 094. Students who have successfully completed MAT 030 or MAT 040 or who place into MAT 094 are eligible to take MAT 120, but must also take the mandatory MAT 094 corequisite course.

Note: If a student passes MAT 092, but does not successfully complete MAT 102, that student will need to take MAT 094 as a mandatory corequisite to MAT 120

**MAT 121—College Algebra**

3 cr. (Fall/Spring/Summer)

College Algebra is the first course for students who plan to continue on toward the study of Calculus. Topics include: a thorough treatment of the concept of functions and their graphs, linear and quadratic functions, polynomial and rational functions, inverse functions, exponential and logarithmic functions and conic sections. (GE 1)

Prerequisite: C or better in MAT 102 or placement in MAT 121

**MAT 122—College Trigonometry**

3 cr. (Fall/Spring/Summer)

College Trigonometry is the second course for students who plan to continue on toward the study of Calculus. Topics include trigonometric functions, graphing techniques, right triangle applications, trigonometric identities, inverse functions, and oblique triangles. (GE 1)

Prerequisite: C or better in MAT 121

**MAT 131—Pre-Calculus**

4 cr. (Fall/Spring/Summer)

A course designed to review advanced techniques in algebra and trigonometry that are necessary for the study of calculus. The major areas of study are: algebra, manipulations, analytic geometry, exponentials, trigonometry, transforms and problem solving. (GE 1)

Prerequisite: Placement in MAT 131

Note: MAT 131 is not open to students who have completed MAT 121 or MAT 122

**MAT 134—Mathematical Reasoning and Proof**

3 cr. (Spring)

Special Topics Course. Mathematical Reasoning and Proof is designed for students who plan to continue their studies in mathematics, mathematics education or science. This course will foster the ability to read and write mathematically correct proofs. Using some of the classic proofs and mathematical patterns, the course familiarizes the student with many of the foundational topics of mathematics as well as some of the current areas of research. The course includes Euclidean Geometry, Mathematical Induction, Strict Arithmetic Proof, and Elementary Number Theory Proofs, among others. The course also explores the developments in mathematics that gave rise to Computer Science.

Prerequisite: C or better in MAT 131, or MAT 122.

**MAT 136—Introduction to Discrete Mathematics**

3 cr. (Fall/Spring)

Discrete mathematics deals with the analysis of discontinuous (separate, distinct, unconnected) phenomena. This branch of mathematics provides much of the underlying methodology for the use of computers. This branch of mathematics has applications in the fields of engineering, physical sciences, economics, behavioral sciences, health sciences, and computer science. Topics covered include: Sets, sequences, functions, prime numbers, elementary logic (proofs), relations (Matrices), induction and recursion, counting and an introduction to graphs and trees.

Prerequisite: C or better in MAT 122

**MAT 205—Calculus 1**

4 cr. (Fall/Spring/Summer)

Analytic geometry topics are introduced as needed to carry out the orderly development of the calculus. Topics include limits, continuity, derivatives & differentiation, implicit differentiation, Rolles' Theorem and Mean Value Theorem, applications of differentiation (related rate problems, optimization problems), First & Second Derivative Tests (relative extrema and increasing/decreasing intervals), points of inflection and concavity, limits at infinity (horizontal asymptotes), curve sketching, differentials, antidifferentiation, area of bounded region using summations, Riemann Sums, the definite integral and the Fundamental Theorem of Calculus. (GE 1)

Prerequisite: C or better in MAT 122 or C or better in MAT 131, or placement in MAT 205

**MAT 206—Calculus 2**

4 cr. (Fall/Spring/Summer)

A continuation of the calculus which builds on the basic concepts of derivatives and integration to include calculus of exponentials, logarithms, trigonometric functions, inverse trigonometric functions and hyperbolics, the area of a region between two curves, solids of revolution, application problems, integration, Trapezoidal rule, Simpson's Rule, L'Hopital's Rule, Taylor and Maclaurin polynomials, sequences and series, and power series. (GE 1)

Prerequisite: C or better in MAT 205.

**MAT 207—Calculus 3**

4 cr. (Fall/Spring/Summer)

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Covers three areas of discourse: vector analysis, partial differentiation and multiple integration. Specific topics include: conic sections, analysis of vectors in two and three space as well as their development as vector functions, directional derivatives, gradients, tangent planes, surface extremes, exact differentials, volume, surface area, moments, Green's theorem, and line integrals. (GE 1)

Prerequisite: C or better in MAT 206.

### **MAT 211—Linear Algebra**

3 cr. (Fall/Spring/Summer)

Designed primarily for students planning to specialize in mathematics, computer science, or engineering. Topics include: vectors in  $\mathbb{R}^2$ ,  $\mathbb{R}^3$ , and  $\mathbb{R}^n$ , systems of linear equations, determinants and matrices, vector spaces, linear independence and basis, linear transformations, eigenvalues and eigenvectors, and diagonalizations.

Prerequisite: C or better in MAT 205.

### **MAT 214—Differential Equations and Series**

4 cr. (Spring/Summer)

The following differential equations topics are covered: equations of first order, linear equations of the second order, operators, and an introduction to partial differential equations.

Prerequisite: C or better in MAT 207