MATHEMATICS (MAT)

MAT 092. Foundations of Mathematics. 4 Credits.
This course is designed for students who need remedial instruction in arithmetic and basic Algebra. Topics studied include: whole numbers order of operations, prime factorization, fractions, decimals, percent, rates, ratios, proportions, signed numbers, variables, algebraic expressions, formulas and equations, graphing linear equations. Students must pass the exit exam with a grade of “C” or better and earn an overall average of “C” in the class for successful course completion. Prerequisites: Appropriate score on Accuplacer Arithmetic Test.

MAT 093. Statway. 1 Credit.
This course is designed for students who need support to succeed in MAT 143. Topics studied include: points and intervals on the number line, the distance between two points on the number line, powers of a number, the square root of a number, summation notation, set notations, Venn diagrams, the union and intersection of sets and the complement of a set, graphing points and lines in two dimensions, understanding slope as the change in y associated with a 1-unit change in x, the equation of a line and the graph of the line, and the vertical distance between a point and a line. This course is required for students who are taking MAT 143 and who successfully completed MAT 092. Prerequisites: MAT 092; MAT 143 (corequisite).

MAT 096. Intermediate Algebra. 4 Credits.
This course completes the developmental math curriculum and prepares students for the credit-bearing course Introduction to Functions & Modeling. Topics include: linear equations and inequalities, graphing equations, polynomials and exponents, factoring polynomials and solving equations, rational expressions, radical expressions, quadratic equations, and introduction to functions. Institutional credit only. Courses that earn institutional credit do not apply towards graduation. A GRADE OF “C” OR HIGHER IS REQUIRED FOR ADVANCEMENT TO NEXT COURSE. Prerequisites: MAT 092 or placement.

MAT 126. Topics In Mathematics. 3 Credits.
This course explores a number of important ideas and practical applications in contemporary mathematics. Required topics include: problem solving strategies; measurement and the metric system; set theory; equations and inequalities; graphing and linear functions; consumer applications such as interest, annuities and present value; and basic statistics. Teachers will select one or two additional topics (as time permits), such as, history of math, voting and apportionment, logic, probability, or geometry. Prerequisite: MAT 092 or placement. No calculators allowed.

MAT 140. Elements Of Mathematics I. 3 Credits.
This course provides a comprehensive, conceptually-based study of the rational and real number systems, along with fundamental concepts of number theory, in order to develop deep levels of understanding of these concepts. Topics include: numeration systems; algorithms for the addition, subtraction, multiplication and division of whole numbers, integers, fractions, and decimals; factors and multiples; greatest common factor and least common multiple; ratio, percent and scientific notation; rational and irrational numbers. Inquiry based instruction, problem solving skills, project work, and the appropriate use of mathematical models are emphasized. This course is recommended for Early Childhood and Elementary Education majors only. Prerequisite: MAT 092 or placement.

MAT 143. Statistics. 3 Credits.
This course presents students with an understanding of elementary statistics by familiarizing them with basic concepts of measures of central tendency and variability, regression and correlation, probability, discrete and continuous random variables, the Central Limit Theorem, confidence intervals, and hypothesis testing. A calculator is required. MAT 093 is required for students taking this course who tested into and successfully completed MAT 092 with a grade of C or better. Prerequisites: MAT 092 or placement; MAT 093 corequisite for students who tested into MAT 092 and successfully complete this course with a C or better.

MAT 162. Introduction to Functions & Modeling (Formerly MAT 134). 4 Credits.
This course provides an introduction to functions, graphing techniques, and modeling. Topics included: visualizing and graphing data, functions and their representations, type of functions and their rates of change, linear functions and equations, Quadratic functions and equations, polynomial, rational and radical functions and equations, and introduction to exponential and logarithmic functions. Prerequisite: MAT 096 or placement.

MAT 163. Pre-Calculus. 4 Credits.
This course is a preparation for MAT 211 Calculus I. Topics include: Mathematical Modeling; Exponential and Logarithmic Functions; Trigonometric Functions; Trigonometric Identities; Laws of Sines and Cosines, Vectors, Polar Coordinates, and Systems of Equations in Two Variables. Computers and/or graphing calculators are used to enhance the study of mathematics. Prerequisite: MAT 162.

MAT 211. Calculus I. 4 Credits.
This course is an introduction to the concepts and methods of differentiation and their application in the areas of engineering, economics, and life sciences. The following topics are covered: differentiation of polynomial, rational, trigonometric, and composite
functions; a study of limits; related rates; optimization problems; curve sketching; antiderivatives; and indefinite integration. Prerequisite: MAT 163 or placement.

MAT 212. Calculus II. 4 Credits.
This course is a continuation of MAT 211 Calculus I with emphasis on the methods of integration and their applications. The following topics are covered: integration of algebraic, trigonometric, inverse trigonometric, logarithmic, and exponential functions; area between two curves; volumes; arc length; work; fluid pressure; Hospital's Rule; Sequences and Series. Prerequisite: MAT 211.

MAT 213. Calculus III. 4 Credits.
A continuation of MAT 212 with emphasis on parametric equations, polar coordinates, vector functions, analytic geometry in space, and multivariable calculus. Topics include: parametric equations, polar coordinates, vectors, dot products and cross products, motion in space, length of curves, planes and surfaces, partial derivatives, max/min problems, Lagrange multipliers, multiple integrals, vector calculus, Green's Theorem, Stokes' Theorem and the Divergence Theorem. A formal project report that incorporates the mathematics of the course will be required in this course as a capstone experience. Prerequisite: MAT 212. Spring.

MAT 220. Linear Algebra. 4 Credits.
This course covers systems of linear equations, Gaussian Elimination, vector equations, linear independence, linear transformations, matrix algebra, inverse of a matrix, subspaces, dimension, rank, determinants, vector spaces and bases, eigenvalues and eigenvectors, The Characteristic Equation, diagonalization, inner product, and orthogonality. The instructor reserves the right to pick applications from the following fields: Computer Science, Engineering, Economics, the Physical Sciences, or Statistics. Prerequisite: MAT 212 (or corequisite). Fall.

MAT 230. Ordinary Differential Equations. 4 Credits.
Differential Equations begins with some definitions and terminology and mathematical models used in a differential equations course. First-order and higher-order differential equations, along with the methods of solutions and their applications are introduced. Modeling with higher-order, Laplace transform, and systems of linear first-order differential equations are covered. At the end, students learn series solutions of linear equations. Numerical methods are covered throughout the course. Prerequisite: MAT 212. Spring.