MAT - MATHEMATICS

MAT 025 Arithmetic Review
This course is designed for students who wish to strengthen their basic arithmetic skills. Arithmetic topics include addition, subtraction, and multiplication facts, addition and subtraction of whole numbers, multiplication and division of whole numbers, and rounding of whole numbers. Students will strengthen their skills during their required class sessions using interactive computer software combined with personalized, on-demand assistance.
Upon successful completion of this course, students should be able to:
Add and subtract single digit whole numbers.
Multiply and divide single digit whole numbers.
Add and subtract whole numbers.
Multiply and divide whole numbers.
Round whole numbers.
Prerequisites: Successful Placement Test Scores or ESL 043 and ESL 044 and ESL 045 and ESL 046.
0 Credits

MAT 050 Mathematics Review
This course is designed for students who wish to strengthen their arithmetic skills and introductory algebra skills. Arithmetic topics include fractions, mixed numbers, decimals, ratio and proportion, percent, and real numbers. Introductory algebra topics include linear equations, linear inequalities, graphing linear equations, and polynomials.
Upon successful completion of this course, students should be able to:
Reduce, add, subtract, multiply, and divide fractions.
Write in words or numerals, add, subtract, multiply, divide and round decimals.
Convert fractions, decimals, and percents.
Solve problems using ratios, proportions, and percents.
Evaluate, translate, and simplify algebraic expressions and use properties to add, subtract, multiply, and divide real numbers.
Solve linear equations and inequalities in one variable.
Graph linear equations in two variables.
Add, subtract, multiply, and divide polynomials.
Prerequisites: MAT 025. Appropriate placement test scores may be accepted.
3 Credits3 Weekly Lecture Hours

MAT 120 Modern College Mathematics
This course is designed to give students in the non-science fields an appreciation of and experience in using problems solving techniques, deductive and inductive reasoning, logical reasoning and symbolic logic to solve problems in a variety of disciplines. It also gives students an overview of the history of the number systems of various cultures, and reviews and reinforces the use of Algebra to solve problems in different fields of study OR uses ratios, proportions and percents to solve consumer-related problems.
Upon successful completion of this course, students should be able to:
Use the notation and operations of set theory.
Use inductive and deductive reasoning and symbolic logic as appropriate to draw a logical conclusion from given information.
Represent numbers from different number systems and add, subtract, multiply and divide in numeration systems other than base ten.
Plus, two of the following three competencies: Analyze the real-number system and apply it to real world problems.
Solve linear equations and inequalities using algebraic and graphic techniques, and apply those techniques to real world problems.
Use ratios, proportions, and percents to solve consumer-related problems.
College Academic Learning Goal Designation: Quantitative Reasoning (QR)
Prerequisites: MAT 050. Appropriate placement test scores may be accepted.
3 Credits3 Weekly Lecture Hours

MAT 121 Introduction to Probability and Statistics
This course provides a solid introduction to probability theory and its applications as well as the visual and mathematical analysis of data and data distributions. This course is similar to Modern College Mathematics (MAT 120) in design and can be used as mathematics elective for students who are not science, engineering, or mathematics majors. It may be taken before Modern College Mathematics. It also serves as a prerequisite for MAT 210.
Upon successful completion of this course, students should be able to:
Apply techniques and formulas to solve problems involving the fundamental counting principle, permutations and combinations.
Use the definitions, axioms, and theorems of probability to solve problems.
Use statistical measures, graphs, and normality to organize, describe, visually represent, and analyze data.
Solve problems involving the simple linear regression line model and the correlation coefficient.
Use a software package to solve problems in the competencies covered.
College Academic Learning Goal Designation: Quantitative Reasoning (QR)
Prerequisites: MAT 050. Appropriate placement test scores may be accepted.
3 Credits3 Weekly Lecture Hours

MAT 125 Mathematics for Teachers of Children I
This course emphasizes both the clear understanding of mathematical ideas and especially the ability to communicate these ideas to elementary school children. Using various mathematical models this course covers the following topics: sets, whole numbers, numeration, estimation, number theory, fractions, decimals, integers and proportion. This course is designed primarily for students pursuing Early Childhood Education (Pre-K-4th grade) or Middle grades (4-8th grade) teacher certification, but may be elected by other education majors.
Upon successful completion of this course, students should be able to:
Utilize the key mathematical processes of communicating, reasoning, solving problems and making connections with mathematics and real world problems, and making connections among the various mathematical systems: whole numbers, integers, and rational numbers (fractions).
Demonstrate an understanding of structure, properties and operations in the whole number system.
Utilize mental computation and estimation techniques.
Demonstrate an understanding of basic number theory concepts and processes.
Demonstrate an understanding of structure, properties and operations in the system of integers.
Demonstrate an understanding of properties and operations with fractions.
Solve problems using ratios, proportions and percents.
College Academic Learning Goal Designation: Quantitative Reasoning (QR)
Prerequisites: MAT 050. Appropriate placement test scores may be accepted.
3 Credits3 Weekly Lecture Hours

MAT 126 Mathematics for Teachers of Children II
As a continuation of Mathematics for Teachers I, this course is designed primarily for students pursuing Early Childhood Education (Pre-K - 4th grade) or Middle grades (4-8th grade) teacher certification, but may be elected by other education majors. The course emphasizes both the clear understanding of mathematical ideas and the ability to communicate these ideas to elementary school children. Topics include data analysis, probability, measurement and geometry in two and three dimensions.
Upon successful completion of this course, students should be able to:
Collect, organize, analyze and interpret statistical data.
Solve probability problems.
Use geometric shapes and patterns to describe real world phenomena.
Demonstrate an understanding of the concept of measurement.
Use triangle congruence and similarity.
Analyze lines and circles using coordinate geometry.
Use transformations to solve geometric problems.
Prerequisite: MAT 125.
3 Credits3 Weekly Lecture Hours

MAT 128 Algebra
This course is designed primarily as a preparatory course for students intending to take College Algebra or Business Precalculus. Topics covered in this course include linear equations and inequalities; quadratic equations; introduction to functions and their graphs; 2x2 linear systems; polynomials; rational expressions and equations; and radical expressions and equations.
Upon successful completion of this course, students should be able to:
Solve linear equations and inequalities.
Solve problems involving functions and their graphs.
Solve problems involving linear systems.
Perform basic operations on polynomials and factor polynomials.
Simplify and perform basic operations on rational expressions and solve rational equations.
Simplify and perform basic operations on radical expressions and solve radical equations.
Solve quadratic equations.
College Academic Learning Goal Designation: Quantitative Reasoning (QR)
Prerequisites: MAT 050. Appropriate placement test scores may be accepted.
4 Credits4 Weekly Lecture Hours

MAT 135 Business Precalculus
This course is designed primarily (but not exclusively) for Business Majors. Topics include graphing and solving problems using linear, quadratic, rational, square root, log, and exponential functions, solving systems of equations, performing operations on matrices, linear programming, and applications from business and economics.
Upon successful completion of this course, students should be able to:
Graph and solve problems using linear, quadratic, polynomial, rational, and square root functions.
Graph and solve problems involving the log and exponential functions.
Perform operations on matrices.
Find the optimal solution of a linear programming problem using the graphing method of two variables.
Apply the mathematical properties of lines, matrices, and exponential and log functions to business and economic problems.
College Academic Learning Goal Designation: Quantitative Reasoning (QR)
Prerequisites: MAT 128. Appropriate placement test scores may be accepted.
3 Credits3 Weekly Lecture Hours

MAT 136 Business Calculus
This course is designed primarily (but not exclusively) for Business majors. Topics include limits, differentiation, and integration. Applications include maxima-minima and problems in management and economics.
Upon successful completion of this course, students should be able to:
Calculate the derivatives of certain algebraic functions, and products, quotients, and compositions of such functions.
Apply the concepts of calculus to optimization problems and consumer and producer surplus.
Calculate the derivatives of exponential and logarithmic functions.
Integrate exponential, certain algebraic functions, and some combinations of these functions using substitution.
Prerequisite: MAT 135.
3 Credits3 Weekly Lecture Hours

MAT 151 College Algebra
This course is intended primarily for those students who are majoring in science, engineering, or mathematics. Together with Precalculus, it prepares students for Calculus I. Topics covered include solving equations (linear, quadratic, radical, polynomial, rational, and absolute value), solving inequalities (linear, polynomial, rational, and absolute value), operations in the Rectangular Coordinate System and the Complex Number System, basic function operations (domain, range, graphing, arithmetic, composition and inverses), and functions (linear, quadratic, polynomial, rational, exponential and logarithmic).
Upon successful completion of this course, students should be able to:
Perform operations in the Complex Number System.
Solve equations and inequalities.
Perform operations in the Rectangle Coordinate System.
Define, evaluate, perform operations and graph functions.
Analyze polynomial functions.
Analyze rational functions.
Analyze exponential and logarithmic functions.
College Academic Learning Goal Designation: Quantitative Reasoning (QR)
Prerequisites: MAT 128 with a grade of 'C' or better. Appropriate placement test scores may be accepted.
4 Credits4 Weekly Lecture Hours

MAT 152 Precalculus
This course is intended primarily for those students who are majoring in science, engineering, or mathematics. Together with College Algebra, it prepares students for Calculus I. Topics covered include trigonometric functions, analytic trigonometry, triangle applications of trigonometric functions, analytic geometry, systems of equations, and sequences and series. NOTE: Pre-requisite requires a grade of 'C' or higher.
Upon successful completion of this course, students should be able to:
Analyze trigonometric functions.
Apply analytic trigonometry.
Use trigonometric functions to solve applied problems.
Apply analytic geometry.
Solve systems of equations.
Analyze sequences and series.
College Academic Learning Goal Designation: Quantitative Reasoning (QR)
Prerequisites: MAT 151 with a grade of 'C' or better. Appropriate placement test scores may be accepted.
4 Credits4 Weekly Lecture Hours

MAT 160 Calculus I
This course is designed for students in the fields of science and engineering. It includes the concept of limit, the rate of change of a function, derivatives, limits of sums, integrals, and applications of differentiation. It is a required course for students majoring in engineering and may be elected by students in Liberal Arts, Business Administration, and Natural Science. It serves as a prerequisite for further mathematics courses and the University Physics sequence. NOTE: Pre-requisite requires a grade of 'C' or higher.
Upon successful completion of this course, students should be able to:
Use the concept of limit.
Differentiate functions.
Use differential calculus to sketch curves and to solve applied problems.
Integrate functions by approximation and by use of the antiderivative.
College Academic Learning Goal Designation: Quantitative Reasoning (QR)
Prerequisites: MAT 152 with a grade of 'C' or better. Appropriate placement test scores may be accepted.
4 Credits3 Weekly Lecture Hours
2 Weekly Lab Hours

MAT 161 Calculus II
This course is a continuation of Calculus I, MAT 160, and is designed for students in the fields of mathematics, science and engineering. It includes inverse trigonometric functions, applications of integration, methods of integration, improper integrals, conic sections, parametric equations, polar coordinates, and infinite series. Calculus II is an appropriate math selection for students interested in STEM careers and may also be applied to most other majors. NOTE: Pre-requisite requires a grade of 'C' or higher.
Upon successful completion of this course, students should be able to:
Differentiate and integrate inverse functions.
Use integral calculus to determine area and volume and to solve applied problems.
Integrate functions using different techniques.
Relate functional and geometric properties of conic sections, curves given in parametric form, and polar curves.
Test infinite series for convergence or divergence.
Prerequisite: MAT 160 with a grade of C or better.
4 Credits3 Weekly Lecture Hours
2 Weekly Lab Hours

MAT 200 Linear Algebra
This course is designed primarily for engineering, computer science and math students planning to transfer to four-year institutions. The topics include systems of linear equations, matrices, determinants, vectors, vector spaces, linear transformations, eigenvalues and applications.
Upon successful completion of this course, students should be able to:
Perform matrix operations including addition, multiplication and finding the inverse.
Solve systems of linear equations using matrix methods.
Find the value of determinants using the methods of cofactors.
Solve systems of linear equations using determinants and Cramer's Rule.
Perform vector arithmetic in two space and three space.
Determine whether a set with the operations of addition and scalar multiplication forms a vector space.
Determine a basis for a vector space.
Use linear transformations to map vectors from one vector space into another.
Find the eigenvalues of a matrix.
Apply linear algebra to the solution of problems in mathematics.
Prerequisite: MAT 161.
3 Credits3 Weekly Lecture Hours

MAT 210 Statistics
This course is designed to give students a tool as well as a language in which they can better understand and analyze the data with which they work and make decisions based on their analyses. It will employ algebra in deriving measures of central tendency and variability for various discrete and continuous distributions and will include the study of the following additional topics: descriptive statistics, inferential statistics, The Central Limit Theorem, the Normal Distribution and its applications, sampling distributions, hypotheses testing, interval and point estimations of population parameters, the Chi-square test with contingency tables, linear correlation and regression, analysis of variance, non-parametric statistics, and applications of statistics in various disciplines. NOTE: Pre-requisite requires a grade of 'C' or higher.
Upon successful completion of this course, students should be able to:
Recognize the role of statistics in critical thinking and its applications using descriptive and inferential statistics.
Use statistical measures of central tendency and statistical measures of variability to describe, represent and analyze data.
Solve problems with bivariate data using scatter diagrams, correlation, and Least-Squares Regression.
Solve problems involving the Normal Probability Distribution.
Solve problems involving sampling distributions.
Solve problems in statistical inference concerned with confidence intervals, minimum sample size determination, goodness of fit tests, and tests for independence and homogeneity.
Test hypotheses for one, two, and three or more samples.
Compute and interpret nonparametric tests.
Use a software package to solve problems in the competencies covered.
College Academic Learning Goal Designation: Quantitative Reasoning (QR)
Prerequisite: MAT 121 or MAT 151 or MAT 152 or MAT 160 or MAT 161 or MAT 200 or MAT 230 or MAT 260 or MAT 261 with a grade of C or better.
3 Credits3 Weekly Lecture Hours

MAT 230 Foundations of Discrete Mathematics
This course is designed to introduce students to the concepts involved in mathematical proofs. Topics covered include the use of logic, quantifiers, set theory, relations and functions, and proof techniques and applications. This course is intended for mathematics and some computer science majors. NOTE: Pre-requisite requires a grade of 'C' or higher.
Upon successful completion of this course, students should be able to:
Use the basic concepts of symbolic logic.
Work with quantifiers.
Apply the basic principles of set theory.
Recognize and use valid proof techniques.
Recognize and use the properties of relations and functions.
Apply proof techniques.
Prerequisite: MAT 161 with a grade of C or better.
3 Credits3 Weekly Lecture Hours

MAT 260 Calculus III
This course is a continuation of Calculus II, MAT 161, and is designed for students in the fields of mathematics, science and engineering. It includes vectors in two- and three-dimensional space, vector-valued functions, partial differentiation, multiple integration, and vector analysis. Calculus III is an appropriate math selection for students interested in STEM careers and may also be applied to most other majors. NOTE: Pre-requisite requires a grade of 'C' or higher.
Upon successful completion of this course, students should be able to:
Use vectors to solve 2-space and 3-space geometrical problems.
Use vector-valued functions to describe motion in space.
Find partial derivatives of functions of two or more variables.
Use partial differentiation to solve applied problems.
Evaluate multiple integrals.
Use multiple integrals to solve applied problems.
Use techniques of vector analysis.
Prerequisites: MAT 161 with Grade of C or better.
4 Credits4 Weekly Lecture Hours

MAT 261 Differential Equations
This course is designed for students in the fields of science and engineering. It includes first-order differential equations, linear higher-order differential equations, applications, systems of equations, Laplace transformation, series and approximate solutions. It is a required course for students majoring in engineering and may be elected by students in Liberal Arts, Business Administration and Science.
Upon successful completion of this course, students should be able to:
Solve first-order differential equations.
Solve linear higher order differential equations.
Use differential equations to solve applied problems.
Solve systems of differential equations.
Use Laplace transformations to solve differential equations.
Solve differential equations by use of series.
Find approximate solutions by use of numerical methods.
Prerequisite: MAT 161 with grade of 'C' or better
3 Credits3 Weekly Lecture Hours