MATHEMATICS (MTH)

MTH 102 Essentials of Algebra (4 Credits)
Topics include operations of real numbers, ratios, proportions, percents, order of operations, linear and quadratic equations, inequalities, graphing, operation of polynomials, roots, radicals, and system of equations. A lab component is used to reinforce the concepts of the topics introduced in class.

MTH 103 Mathematics in General Education (3 Credits)
Emphasis on global, unifying ideas in mathematics and the connections between contemporary mathematics and modern society. Topics are selected from elementary mathematics, logic, probability and statistics, discrete systems, geometry, measurement, and consumer applications. This course satisfies the minimum general education mathematics requirement.
Prerequisites: Take MTH-101.

MTH 103H Honors Mathematics in General Education (3 Credits)
Emphasis on global, unifying ideas in mathematics and the connections between contemporary mathematics and modern society. Topics selected from elementary mathematics, logic, probability and statistics, discrete systems, geometry, measurement, and consumer applications. This course satisfies the minimum general education mathematics requirement.

MTH 105 Intermediate Algebra (3 Credits)
Preparation for the pre-calculus including linear and quadratic equations, graphing, polynomials, roots, radicals, and systems of equations. (Satisfies the minimum general education mathematics requirement.)
Prerequisites: Take MTH-101.

MTH 131 Pre-Calculus for Business Majors (3 Credits)
Transition from elementary mathematics to calculus including a review of exponents, factoring, linear and quadratic equations, inequalities, functions, graphs, system of equations, exponential and logarithmic functions.
Prerequisites: Take MTH-105. Take MTH-102.

MTH 132 Calculus for Business Majors (3 Credits)
Introduction to elementary calculus including limits, continuity, differentiation, integration, and applications in business.
Prerequisites: Take MTH-131. or Take MTH-151.

MTH 141 Elements of Mathematics for Teachers I (3 Credits)
Thorough treatment of the modern mathematics curricula for prospective school teachers. Emphasis on sets and logic, number systems, number theory, algebra, geometry and measurement. Computer-based laboratory component with manipulatives included.
Prerequisites: Take MTH-101.

MTH 142 Elements of Mathematics for Teachers II (3 Credits)
Continued treatment of the modern mathematics curricula for prospective school teachers. Emphasis on geometry and measurement.

MTH 151 College Algebra (3 Credits)
This course emphasizes the study of basic algebra, stressing fundamental concepts and reasoning used in mathematics and the sciences. Students are expected to bring to the course knowledge of the essentials of elementary and intermediate algebra. Emphasis is placed on those skills necessary for calculus sequences.
Prerequisites: Take MTH-105. Take MTH-102.

MTH 151B College Algebra for Biology Majors (3 Credits)
This course emphasizes the study of basic algebra and stresses fundamental concepts and reasoning used in mathematics, biology and chemistry. Students are expected to bring to the course knowledge of the essentials of elementary and intermediate algebra.

MTH 153 College Algebra & Trigonometry (3 Credits)
Extension of algebra topics and a treatment of trigonometry necessary for the study of advanced subjects in mathematics and the sciences. Preparation for the calculus sequence. Topics include exponential and logarithmic functions, trigonometric functions, trigonometric identities, and trigonometric applications necessary for the study of advanced subjects in mathematics and the sciences.
Prerequisites: Take MTH-151.

MTH 153H Honors College Algebra & Trigonometry (3 Credits)
Extension of algebra topics and a treatment of trigonometry necessary for the study of advanced subjects in mathematics and the sciences. Preparation for the calculus sequence. Topics include exponential and logarithmic functions, trigonometric functions, trigonometric identities, and trigonometric applications necessary for the study of advanced subjects in mathematics and the sciences.

MTH 184 Calculus I (4 Credits)
This is a first course in the essentials of Calculus, necessary for more advanced study in the natural sciences and mathematics. Topics include limits, continuity, derivatives and applications, antiderivatives, and the Fundamental Theorem of Calculus. The course integrates some calculus applications with computer activities.
Prerequisites: Take MTH-153.

MTH 184H Honors Calclulus I (4 Credits)
Treatment of the essentials of calculus necessary for the study of more advanced subjects in the natural sciences and mathematics including limits, continuity, derivatives and applications, antiderivatives and the Fundamental Theorem of Calculus. The course integrates some calculus applications with computer activities.

MTH 242 History of Mathematics (3 Credits)
Study of the history and development of mathematics as a vital and integral part of the history of numbers and numerals, computation, geometry, algebra, trigonometry, calculus, and modern mathematics.
Prerequisites: Take MTH-184.

MTH 250 Elementary Statistics Concepts (3 Credits)
Introduction to statistics including graphical data representation, basic probability concepts, sampling and expectation, confidence interval, and hypothesis testing for sample mean and proportion.
Prerequisites: Take MTH-105.

MTH 250H Honors Elementary Statistics Concepts (3 Credits)
Introduction to statistics including graphical data representation, basic probability concepts, sampling and expectation, confidence interval and hypothesis testing for sample mean and proportion.
Prerequisites: Take MTH-105.

MTH 251 Calculus II (4 Credits)
Applications of definite integrals, the calculus of transcendental functions, infinite series, and integration techniques. Some topics are integrated with computer activities.
Prerequisites: Take MTH-184.

MTH 251H Honors Calculus II (4 Credits)
Applications of definite integrals, the calculus of transcendental functions, infinite series, and integration techniques. Some topics are integrated with computer activities.

MTH 252 Calculus III (4 Credits)
Investigation of calculus concepts at the intermediate level including polar coordinates, vectors, and the calculus of several variables.
Prerequisites: Take MTH-251.

MTH 252H Honors Calculus III (4 Credits)
This course is a continuation of Calculus II (MTH 251). The course investigates calculus concepts at the intermediate level designed for mathematics and science majors. Topics include polar coordinates, vector analysis, and the calculus of several variables on an honors level.
Prerequisites: Take MTH-251.

MTH 273 Mathematical Foundations (3 Credits)
This course looks at fundamental topics to further study in mathematics. Topics include basic concepts of set theory, basic concepts of logic, basic concepts of algebra, methods of mathematical proof, relations and functions, the concept of limit and continuity, study of the real number set and its topology, and some topics from calculus.
Prerequisites: Take MTH-251.

MTH 300 Linear Algebra (3 Credits)
Introduction to the basic concepts, techniques, and elementary applications of linear algebra including matrices, linear systems, gaussian elimination, vector spaces, linear independence, linear transformations, eigenvalues and eigenvectors.
Prerequisites: Take MTH-184.

MTH 300H Honors Linear Algebra (3 Credits)
This course is an introduction to basic concepts, techniques, and elementary applications of linear algebra. Topics to be covered are matrices, linear systems, Gaussian elimination, vector and vector spaces, linear independence, linear transformations, eigenvalues and eigenvectors, finite-dimensional spectrum theory on an honors level.
Prerequisites: Take MTH-184.

MTH 310 Discrete Mathematics (3 Credits)
Introduction to discrete math including topics in graph theory, management science, the mathematics of social change, and statistics. Use of manipulatives and other learning tools included.

MTH 311 Modern Geometry I (3 Credits)
Re-examination of Euclidean plane geometry as a postulational system. Emphasis on formulating definitions and constructing valid proofs including mathematical reasoning, postulational method, finite geometries, congruence, similarity, parallelism, and construction with ruler and compass.
Prerequisites: Take MTH-184.

MTH 331 Algebraic Structures (3 Credits)
An introduction to modern algebra, which deals with selected algebraic structures (groups, rings, fields, etc.). The course stresses the axiomatic approach and the logic and method of proof.
Prerequisites: Take MTH-300.

MTH 351 Probability & Statistics I (3 Credits)
Given the importance of probability and statistics in the research fields of most sciences, this course has been designed to serve as a calculus-based introduction to fundamental concepts in probability and statistics. The course places particular emphasis on the fundamental concepts of probability and presents basic statistics concepts as an extension of these concepts.
Prerequisites: Take MTH-251.

MTH 351H Honors Probability & Statistics I (3 Credits)
Given the importance of probability and statistics, in the research fields of most sciences, this, course has been designed to serve as a, calculus-based introduction to fundamental, concepts in probability and statistics. The course, places particular emphasis on the fundamental, concepts of probability and presents basic, statistics concepts as an extension of these, concepts.
Prerequisites: Take MTH-251.

MTH 352 Probability & Statistics II (3 Credits)
Given the importance of probability and statistics in the research fields of most sciences, this course has been designed to serve as a calculus-based introduction to some advanced concepts in probability and statistics. Given that it is the second course in the sequence, the course also provides reinforcement of the fundamental concepts covered in MTH 351. While building upon these fundamentals, this course will place particular emphasis on the concepts of statistical inference and experimental design.
Prerequisites: Take MTH-351.

MTH 371 Discrete Mathematical Structures (4 Credits)
An introduction to the area of discrete mathematics that is important to computer science. Topics include logic, sets, functions and relations, algorithms, counting principles, and graph theory.

MTH 372 Differential Equations (3 Credits)
A first course in ordinary differential equations. Topics include first-order equations, higher order linear differential equations, and the Laplace transform. Applications include growth/decay models, electric circuits, and the vibrational models.
Prerequisites: Take MTH-252.

MTH 373 Advanced Vector Calculus (3 Credits)
A one-semester course in the calculus of functions of several variables and vector analysis. Topics include derivatives and integrals of functions of several variables, vector fields, divergence, curl, Green's Theorem, and Lagrange Multipliers. Course includes selected applications to the physical sciences.
Prerequisites: Take MTH-252.

MTH 382 Introduction to Applied Mathematics (3 Credits)
A junior-level introduction to applications of mathematics designed for mathematics, computer science, and engineering majors. Topics include Fourier Series, Laplace transforms, Sturm-Liouville problems, and Bessel functions.
Prerequisites: Take MTH-372.

MTH 401 Numerical Analysis I (3 Credits)
Introduction to numerical techniques for problem solving involving the use of the computer. Topics include error analysis, solutions of one variable equations, solutions of linear and nonlinear systems of equations, iterative techniques in matrix algebra, and approximating eigenvalues.
Prerequisites: Take MTH-300. Take MTH-372.

MTH 402 Numerical Analysis II (3 Credits)
Continuation of MTH 401. Topics include polynomial interpolation and approximation, numerical differentiation and integration, approximation theory, and numerical approaches to ordinary and partial differential equations.
Prerequisites: Take MTH-401.

MTH 431 Abstract Algebra (3 Credits)
Continuation of MTH 331. Topics include a more advanced discussion of groups, rings, fields, homomorphism, isomorphism, and automorphism.
Prerequisites: Take MTH-331.

MTH 454 Experimental Designs (3 Credits)
Topics to be covered include single factor experiments, residuals, randomized block designs, general factorials, blocking, regression models, unbalanced data, confounding blocks, and Taguchi experiments.
Prerequisites: Take MTH-251. Take MTH-351.

MTH 472 Advanced Calculus II (3 Credits)
Rigorous treatment of functions of one and several variables, improper integrals, sequences, infinite series, uniform convergence, and applications. Students are expected to improve their ability to work in an abstract setting using precise definitions and formal proofs and to present their work in class.

MTH 473 Real Analysis (3 Credits)
Offers a solid theoretical foundation for a careful study of the real number system and functions defined on this system. Provides the substance and basis for enabling students to understand much of traditional calculus, including proofs of many of the standard results on limits of sequences, limits of functions, continuity, uniform continuity, sequences and series of functions, integrals, and approximations.
Prerequisites: Take MTH-373.

MTH 474 Complex Variables (3 Credits)
Treats the fundamentals of analytic function theory. Topics include algebra and geometry of the complex numbers, limits, derivatives, Cauchy-Riemann equations, Cauchy's Theorem, Taylor and Laurent series, and contour integration.
Prerequisites: Take MTH-473.

MTH 484 Topics in Applied Mathematics (3 Credits)
This course is a continuation of Math 382, Introduction to Applied Mathematics I. It is a senior-level course containing advanced topics in mathematical and scientific applications. Topics vary but may include partial differential equations, Fourier analysis and boundary value problems, with selected applications in mathematical physics and engineering. The course integrates some applications of partial differential equations with computer activities.
Prerequisites: Take MTH-382.

MTH 484H Honors Topics in Applied Mathematics (3 Credits)
This course is a continuation of Math 382, Introduction to Applied Mathematics I. It is a senior-level course containing advanced topics in mathematical and scientific applications. Topics vary but may include partial differential equations, Fourier analysis and boundary value problems, with selected applications in mathematical physics and engineering. The course integrates some applications of partial differential equations with computer activities.
Prerequisites: Take MTH-382.

MTH 496 Mathematics Seminar I (2 Credits)
Culminating course designed to review and fortify knowledge of essential mathematics concepts and to synthesize mathematical knowledge and experiences through participation in a research project of the student's choice. Results of the research are presented to peers and other interested members of the academic community. Course includes a comprehensive examination used to assess the objectives of the core mathematics courses.

MTH 497 Mathematics Seminar II (2 Credits)
Culminating sequence designed to review and fortify knowledge of essential mathematics concepts and to synthesize mathematical knowledge and experience through the completion of an approved research project. Results of the research are presented to peers and other interested members of the academic community. Course includes a comprehensive examination used to assess the objectives of the core mathematics courses.