Mathematics

MTH 05100 Basic Mathematics (2)
This is a computer-based self-paced course for students who need to review the basics of mathematics. Topics include order of algebraic operations, fractions, proportions, percents, exponents, scientific notation and calculator computations, simple graphs and diagrams, linear and quadratic equation solving, word problems. This course will not earn elective credit (thus, does not count toward the 128 hours required for graduation), nor will it satisfy the general education requirement in mathematics. Offered every semester.

MTH 11000 Intermediate Algebra (3)
This course includes the following topics: operations with real numbers, first degree equations and inequalities, operations with polynomials, factoring, operations with rational expressions, complex numbers, quadratic equations, elementary functions. Only students who are planning to pursue a degree requiring College Algebra, and who require remedial work beforehand should enroll in this course. Lab fee required. Counts for elective credit; will not satisfy the general education requirement in mathematics. Offered every semester.

MTH 12100 Introduction to Contemporary Mathematics (3) (GE-Math)
This course is an introductory course on how mathematics is used today. Students will study consumer mathematics plus additional topics selected from apportionment, fair divisions, geometry, growth and decay, numbers systems for encoding information, probability and counting techniques, routes and network, scheduling, statistics, voting systems. Offered every semester. Prerequisites: C or better in MTH 05100 or MTH 11000 or passing the placement test.

MTH 13100 Quantitative Methods for Business (3) (GE-Math)
This course is designed to introduce business students to the use of quantitative methods. Topics covered will include solving and graphing linear functions and inequalities; writing mathematical models; solving systems of equations; linear regression; and an introduction to linear programming. Tools used will include calculators and computers. A graphing calculator is required. Offered every semester. Prerequisite: C or better in MTH 05100 or MTH 11000 or passing the placement test.

MTH 13400 Concepts in Mathematics I (3) (GE-Math)
This course is an introduction to the basic language and concepts of mathematics and is designed for elementary education majors, and students seeking middle school certification in mathematics. Topics include sets, number systems, the real number system, mathematical systems, logic, problem-solving, equations, and inequalities. Offered every semester. Prerequisites: C or better in MTH 05100 or MTH 11000 or passing the placement test.

MTH 13500 Concepts in Mathematics II (3) (GE-Math)
This course provides an introduction to the basic concepts of probability (including counting techniques), statistics, and geometry. The basic geometry concepts to be covered include the fundamentals of planar and 3-dimensional geometry; constructions, congruence and similarity; concepts of measure; and motion geometry and tessellations. Offered every semester. Prerequisites: C or better in MTH 05100 or MTH 11000 or passing the placement test.

MTH 14100 Basic Statistics (3) (GE-Math)
This course is an introduction to the theory and applications of statistics, including probability, descriptive statistics, random variables, expected values, distribution functions, and hypothesis testing. Offered every semester. Prerequisites: C or better in MTH 05100 or MTH 11000 or passing the placement test.

MTH 15100 College Algebra (3) (GE-Math)
Topics covered: functions and graphs, polynomial and rational functions, exponentials and logarithms, systems of equations and inequalities, sequences and the binomial theorem. The course is designed primarily for science and related majors and students seeking middle school mathematics certification. Course offered every semester. Prerequisites: C or better in MTH 05100 or MTH 11000 or passing the placement test.

MTH 15200 Pre-calculus: Elementary Functions (3) (GE-Math)
This course serves as preparation for calculus covering polynomial and rational functions, exponential and logarithmic functions, trigonometric functions, applications and systems of linear equations. A graphing calculator is required. Offered every semester. Prerequisite: C or better in MTH 15100 or passing the placement test.

MTH 17000 Survey of Calculus (3) (GE-Math)
Topics include a brief review of trigonometry; limits and continuity; derivatives and integrals of polynomials, rational, exponential, logarithmic and trigonometric functions; relative extrema and points of inflection; graphs of functions, derivatives, and integrals; implicit differentiation and related rates; the extreme value theorem; definite and indefinite integrals; and the Fundamental Theorem of Calculus. A graphing calculator is required. Offered every semester. Prerequisite: C or better in MTH 15100 or higher level math course, or passing the placement test.
MTH 22100 Discrete Structures (3)
This course will briefly review logic, sets, functions and relations, and methods of proof before using these concepts to study discrete (rather than continuous) mathematics. Topics covered may include combinatorics, graph theory, algorithms and their analysis, Boolean algebra, finite state machines, finite difference equations, and applications of these topics. Offered every fall semester. Prerequisite: C or better in MTH 15100 or higher level math course.

MTH 24100 Statistics for Natural Science (3) (GE-Math)
Topics covered in this course include counting rules and probability, normal and binomial distributions, Chi-square, t-tests and F-tests, 174 ANOVA, linear regression, precision, accuracy, absolute and relative error, random error, means, medians, standard deviation (population and sample), standard error of the mean, variance, relative standard deviation, coefficient of variation, confidence levels and intervals, Q-tests, and definitions and sources of error (methodological, sampling, procedural and instrument). Offered every semester. Prerequisites: C or better in MTH 15100 or passing the placement test.

MTH 27100 Calculus I (5) (GE-Math)
This course is the first study of real functions and some of their applications. Topics include limits, continuity, differentiation and integration. A graphing calculator is required. Offered every semester. Prerequisites: C or better in MTH 15200 or passing the placement test.

MTH 27200 Calculus II (5) (GE-Math)
This course is a continuation of the study of real functions of one variable. Topics include integration, applications of integration, and methods of integration, infinite series, and vectors. A graphing calculator is required. Offered every semester. Prerequisite: C or better in MTH 27100.

MTH 28000 Interest Theory (3)
This course is a differential calculus based introduction to interest theory and the time value of money. Students will learn about simple and compound interest, nominal and effective rates of interest and discount, standard and nonstandard annuities, amortization schedules, bond valuation, the effects of inflation, duration and volatility, and immunization. This course covers the topics needed to be successful on Exam FM/2 by the Society of Actuaries and the Casualty Actuaries Society. Offered every spring semester. Prerequisite: C or better MTH 27100.

MTH 28500 Introduction to Advanced Mathematics (3)
This course is a transition course from elementary to advanced mathematics. Topics include logic, proof techniques, set theory, discrete math, the natural numbers, induction, functions, relations, and the foundations of number systems. Offered every spring semester. Prerequisite: C or better in MTH 28500.

MTH 30300 Calculus III (5)
This course is the study of real functions of more than one variable. Topics include partial derivatives, gradient, potential functions, line integral, multiple integration, and Taylor's formula. A graphing calculator is required. Offered every fall Semester. Prerequisite: C or better in MTH 27200.

MTH 31100 Differential Equations (3)
This course examines ordinary differential equations and some applications, including first order equations, linear differential equations, Laplace Transform, and series solutions. Offered every spring semester. Prerequisites: C or better in MTH 27200.

MTH 31300 History of Mathematics (3)
This course looks at the history of Mathematics, including the Classical, Medieval, Renaissance, Early Modern, and Modern periods, spanning the time from 3000 BC to the present. Offered intermittently. Prerequisite: Completion of WPA or ENG 21000and MTH 28500.

MTH 31500 Linear Algebra I (3)
This course is the study of the finite dimensional vector spaces, linear mappings between them and applications to differential equations and geometry. Topics include solution of linear equations, matrices, determinants, eigenvalue problems, bilinear mappings and forms, diagonalisation. Offered every fall semester. Prerequisite: C or better in MTH 27200.

MTH 31600 Linear Algebra II (3)
This course is the study of the finite dimensional vector spaces, linear mappings between them and applications to differential equations and geometry. Topics include solution of linear equations, matrices, determinants, eigenvalue problems, bilinear mappings and forms, diagonalisation. Offered intermittently. Prerequisite: C or better in MTH 31500.
MTH 32000 Algebraic Structures (3)
This course examines the main structures of abstract algebra. Groups, rings and fields will be studied together with applications to
gometry, and number theory. Offered every fall semester. Prerequisite: Completion of WPA or ENG 21000 and C or better in MTH 28500.

MTH 33000 Geometry (3)
This course is a careful review of Euclidean geometry of the plane and space, and an introduction to non-Euclidean geometry. Course
offered every spring semester. Prerequisites: Completion of WPA or ENG 21000 and C or better in MTH 28500.

MTH 34100 Probability and Mathematical Statistics I (3)
This course is the first part of a calculus-based sequence. Topics include combinatorics, probability spaces, discrete and continuous
distributions, variable transformation, multivariate distributions. Offered every spring semester. Prerequisites: MTH 30300.

MTH 34200 Probability and Mathematical Statistics II (3)
This course is the second part of a calculus-based sequence. Topics covered include estimation using confidence intervals, maximum
likelihood, Bayesian methods, hypothesis testing regression analysis, and theory of statistical interference. Offered intermittently.
Prerequisites: C or better in MTH 34100.

MTH 35100 Numerical Methods (3)
This course is the first course in numerical methods, including solution of linear and non-linear equations, numerical integration and
differentiation, the theory of approximation, and solution of differential equations. Offered intermittently. Prerequisites: C or better in
MTH 27200 and CSC 14400.

MTH 36100 Applied Engineering Mathematics (3)
This course will include partial differential equations of mathematical physics, eigenfunction function expansions, the Laplace and
Fourier transforms, and numerical methods. Offered intermittently. Prerequisites: C or better in MTH 30300 and MTH 31100.

MTH 37000 Advanced Calculus (3)
This course provides a systematic and rigorous development of the multivariable calculus of functions on Euclidean space. Topics
covered include limits, continuity and differentiability of functions, the Riemann integral, vector calculus, and sequences and series.
Offered every spring semester. Prerequisites: C or better in MTH 28500 and MTH 30300.

MTH 39000 Special Topics in Applied Mathematics (3)
Topics offered include preparation for the Society of Actuaries exams, computational biology (bio-informatics), operations research,
and mathematical finance. Prerequisites: Permission of instructor and dean.

MTH 49000 Special Topics in Mathematics (3)
Topics to be featured include differential geometry, complex analysis, field theory, number theory, real analysis. Prerequisite:
Permission of instructor and dean.