MATH COURSES

Opposite each course title are three numbers such as 3-2-4. The first number indicates the number of regular classroom hours for the course each week; the second number indicates the number of laboratory hours per week; and the third number indicates the hours of credit awarded for the successful completion of the course. Listed in parentheses at the end of each course description is the term(s) that the course is normally offered. F=Fall, S=Spring, and M=Summer.

The college reserves the right to cancel or delete any course with insufficient enrollment.

Courses

MATH 0996. Support for Elem Statistics. 2-0-2 Units.
This Learning Support course provides co-requisite support in mathematics for students enrolled in MATH 1401 – Elementary Statistics. Topics will parallel topics being studied in MATH 1401 and the course will provide support for the essential quantitative skills needed to be successful in MATH 1401. Taken with MATH 1401, this course provides an introduction to statistics. Course content includes descriptive statistics, probability theory, confidence intervals, hypothesis testing, and other selected statistical topics. Emphasis is on the mathematical foundations for statistics.

MATH 0997. Support Quantitative Skill/Rea. 2-0-2 Units.
This Learning Support course provides corequisite support in mathematics for students enrolled in MATH 1001 – Quantitative Reasoning. Topics will parallel topics being studied in MATH 1001 and the course will provide support for the essential quantitative skills needed to be successful in MATH 1001. Taken with MATH 1001, topics to be covered will include logic, basic probability, data analysis and modeling from data.(F,S)
Corequisites: MATH 1001 Quantitative Reasoning.

MATH 0998. Support for Math Modeling. 2-0-2 Units.
This Learning Support course provides corequisite support in mathematics for students enrolled in MATH 1101 – Introduction to Mathematical Modeling. Topics will parallel topics being studied in MATH 1101 and the course will provide support for essential quantitative skills needed to be successful in MATH 1101. Taken with MATH 1101, this course is an introduction to mathematical modeling using graphical, numerical, symbolic, and verbal techniques to describe and explore real-world data and phenomena. Emphasis is on the use of elementary functions to investigate and analyze applied problems and questions, supported by the use of appropriate technology, and on effective communication of quantitative concepts and results.(F,S,M)
Corequisites: MATH 1101 Introduction to Mathematical Modeling.

MATH 0999. Support for College Algebra. 2-0-2 Units.
This Learning Support course provides corequisite support in mathematics for students enrolled in MATH 1111 – College Algebra. Topics will parallel topics being studied in MATH 1111 and the course will provide support for the essential quantitative skills needed to be successful in MATH 1111. Taken with MATH 1111, this course provides an in-depth study of the properties of algebraic, exponential and logarithmic functions as needed for calculus. Emphasis is on using algebraic and graphical techniques for solving problems involving linear, quadratic, piece-wise defined, rational, polynomial, exponential and logarithmic functions. (F,S,M) MATH 1111 College Algebra.

MATH 1001. Quantitative Skills/Reasoning. 3-0-3 Units.
This course is an alternative in Area A of the Core Curriculum and is not intended to supply sufficient algebraic background for students who intend to take precalculus or the calculus sequences for mathematics and science majors. This course places quantitative skills and reasoning in the context of experiences that students will be likely to encounter. It emphasizes processing information in context from a variety of representations, understanding of both the information and the processing, and understanding which conclusions can be reasonably determined.(F,S)
Prerequisites: Placement into corequisite Learning Support mathematics, unless exempt.

MATH 1001L. Quantitative Skills/Reasoning. 3-0-3 Units.

MATH 1101. Intro to Mathematical Modeling. 3-0-3 Units.
This course is not intended to supply sufficient algebraic background for students who intend to take precalculus or the calculus sequence for mathematics and science majors. This course is an introduction to mathematical modeling using graphical, numerical, symbolic, and verbal techniques to describe and explore real-world data and phenomena. Emphasis is on the use of linear, polynomial, exponential, and logarithmic functions to investigate and analyze applied problems and questions, supported by the use of appropriate technology, and on effective communication of quantitative concepts and results.(F,S,M)
Prerequisites: Placement into co-requisite Learning Support mathematics, unless exempt.

MATH 1101L. Intro to Mathematical Modeling. 3-0-3 Units.

MATH 1111. College Algebra. 3-0-3 Units.
Presents topics in algebra, including the number system, polynomials, algebraic functions, exponents, radicals, linear and quadratic equations, inequalities, lines in the plane, linear modeling, conics, algebra of functions, exponential and logarithmic functions and systems of equations and inequalities.(F,S,M)
Prerequisites: MATH 0998 and MATH 1101 if not eligible for MATH 0999; or MATH 1001, MATH 1401 unless exempt.
Corequisites: MATH 0999 unless exempt from learning support.

MATH 1111L. College Algebra. 3-0-3 Units.

MATH 1113. Precalculus Mathematics. 3-0-3 Units.
Provides immediate transition from high school algebra into calculus and physics. Material goes beyond that normally covered in Mathematics 1111. Algebra topics include linear, quadratic equations, functions and graphing, exponential and logarithmic functions. Trigonometry topics include trigonometric functions and inverse, law of sines, law of cosines and identities. For students planning to take calculus and/or physics.(F,S,M)
Prerequisites: MATH 1111.

MATH 1401. Elementary Statistics. 3-0-3 Units.
This is a non-calculus based introduction to statistics. Course content includes descriptive statistics, probability theory, confidence intervals, hypothesis testing, and other selected statistical topics.
Prerequisites: Placement into corequisite Learning Support mathematics, unless exempt.

MATH 1401L. ELEMENTARY STATISTICS. 3-0-3 Units.

MATH 1501. Calculus I. 4-0-4 Units.
This course includes material on functions, limits, continuity, the derivative, anti-differentiation, the definite integral, and techniques of integration.
Prerequisites: MATH 1113.

MATH 2008. Found of Numbers & Operations. 3-0-3 Units.
This course will emphasize the understanding and use of the major concepts of number and operations. Topics include problem-solving strategies; inductive and deductive reasoning; numeration systems and place value; operations and algorithms; identity elements and inverse operations; rational and irrational numbers; integers and number theory; special sets of numbers; exponents and decimals; ratios, percent's, and proportional reasoning.(F,S)
Prerequisites: MATH 1101, MATH 1111, or MATH 1113.

MATH 2181. Applied Calculus. 3-0-3 Units.
Surveys differential and integral calculus of polynomial, rational, exponential and logarithmic functions. Detailed applications to problems and concepts from business, economics and life science are covered.(F,S)

Prerequisites: MATH 1111 or MATH 1113 with a grade of C or better.

MATH 2253. Calculus and Analytic Geom I. 4-0-4 Units.
Includes topics limits and continuity, derivatives and their applications and an introduction to the concept of the integral. The first in a four course sequence in Calculus. Prerequisite: MATH 1113 or satisfactory mathematics scores of SAT 600/ACT 26 and one year of high school trigonometry.(F,S,M)
Prerequisites: MATH 1113.

MATH 2254. Calculus and Analytic Geom II. 4-0-4 Units.
Emphasizes the definite integral and its applications, the calculus of trigonometric, exponential, logarithmic, hyperbolic and inverse functions, techniques of integration, improper integrals, L' Hopital's Rule, infinite series and conic sections. The second course in the Calculus sequence.(F,S,M)
Prerequisites: MATH 2253.

MATH 2255. Calculus and Analytic Geom III. 4-0-4 Units.
Emphasizes calculus in three dimensions. Topics include vectors, parametric equations, partial derivatives, multiple integrals and their applications and topics in vector calculus. The third course in the Calculus sequence.(F,S,M)
Prerequisites: MATH 2254.

MATH 2256. Introduction to Linear Algebra. 3-0-3 Units.
Introduces low-dimensional linear algebra through eigenvalues and eigenvectors. Applications to linear systems, least-square problems, and the calculus, including elementary differential equations.(F,S,M)
Prerequisites: MATH 2253.
Corequisites: MATH 2254.

MATH 2403. Differential Equations. 3-2-4 Units.
A study of differential equations, including first and higher order equations, linear and nonlinear systems of equations, numerical methods to approximate solutions, using Laplace transforms to determine solutions, and methods that yield infinite series solutions.(F,S,M)
Prerequisites: MATH 2254 and Co-requisite: MATH 2256.

MATH 2602. Linear & Discrete Mathematics. 3-2-4 Units.
Explores topics in linear algebra, induction, combinatorics, difference equations, and multivariate optimization with an emphasis on discrete and recursive methods.(F,S)
Prerequisites: MATH 2255.

MATH 2770. Statistics and Applications. 3-0-3 Units.
Introduces the student to topics in probability, probability distributions, point estimation, confidence intervals hypothesis testing, linear regression and analysis of variance.(F,S,M)
Prerequisites: MATH 2255.

MATH 3050. Biological Statistics. 3-0-3 Units.
Advanced concepts in statistics are introduced. Topics include experimental design, hypothesis testing, t-test, z-test, chi-squared test, regression, ANOVA, and non-parametric methods. (F) Pre-requisite: MATH 2200 or 1401.

MATH 3101. Intro to Advanced Mathematics. 3-0-3 Units.
Preparation in mathematical reasoning and proof-writing necessary for upper division course work in mathematics. Topics include logic, integers and induction, sets and relations, equivalence relations and partitions, and functions.(S)
Prerequisites: MATH 2254.

MATH 3201. Geometry. 3-0-3 Units.
An introduction to Euclidean and non-Euclidean geometries developed with the study of constructions, transformations, applications, and the rigorous proving of theorems.(F)
Prerequisites: MATH 3101.

MATH 3301. Combinatorics. 3-0-3 Units.
Basic counting principles: permutations, combinations, probability, occupancy problems, and binomial coefficients. More sophisticated methods include generating functions, recurrence relations, inclusion/exclusion principles, and the pigeonhole principle. Additional topics include asymptotic enumeration, Polya counting theory, combinatorial designs, coding theory, and combinatorial optimization.(Spring Odd Years)
Prerequisites: MATH 2254.

MATH 3401. Linear Algebra. 3-0-3 Units.
Theory and applications of matrix algebra, vector spaces, and linear transformations; topics include characteristic values, the spectral theorem, and orthogonality.(Spring Even Years)
Prerequisites: MATH 2256.

MATH 3511. Intro to Numerical Analysis. 3-0-3 Units.
Numerical solution of equations, numerical solution of algebraic systems, least squares techniques, numerical differentiation and integration, error analysis. Written programs using algorithms. (Spring Odd Years). Co-requisite: MATH 2256.
Prerequisites: MATH 2254 and CMPS 1301 or CMPS 1371.

MATH 3703. Geometry for P-8 Teachers. 3-0-3 Units.
Continues MATH 2008, with emphasis for teachers of grades P-8. Logic; real numbers; basic and transformational geometry; measurement, including the metric system; problem solving; methods and materials for teaching mathematics at the P-8 level.(S,M)
Prerequisites: MATH 2008.

MATH 3803. Algebra for P-8 Teachers. 3-0-3 Units.
Provides special emphasis for teachers of grades P-8 on understanding of the fundamental concepts of algebra with particular attention to specific methods and materials of instruction.(F,S)
Prerequisites: MATH 2008.

MATH 3900. Special Topics in Mathematics. 0-0-1-3 Unit.
Variable 1–3 hours. Advanced concepts in mathematics are presented, the content varies with the topic. Course may be repeated for credit when topic differs. Pre-requisite: MATH 2253 Calculus and Analytic Geometry I and Permission of Instructor. (Offered As Needed).

MATH 4001. History of Mathematics. 3-0-3 Units.
Examines major developments, central themes, and important issues in mathematics throughout history. Undertakes an overview of the historical development of the discipline by focusing on specific theories, problems, and results.(F)
Prerequisites: MATH 2254.

MATH 4101. Abstract Algebra I. 3-0-3 Units.
An axiomatic approach to algebraic structures. Topics include groups, permutations, homomorphisms, and factor groups.(F)
Prerequisites: MATH 3101.

MATH 4102. Abstract Algebra II. 3-0-3 Units.
Examines the central concepts of ring theory and field theory. Topics include modules, Galois theory, integral domains, and advanced linear algebra. Strongly recommended for students intending to complete a graduate degree in mathematics.(S)
Prerequisites: MATH 4101.

MATH 4201. Number Theory. 3-0-3 Units.
A study of elementary problems in number theory with topics from divisibility, congruences, residues, special functions, Diophantine equations, and continued fractions.(S)
Prerequisites: MATH 3101.

MATH 4301. Graph Theory. 3-0-3 Units.
Elementary theory of graphs and digraphs. Topics include connectivity, reconstructions, trees, Euler's problem, hamiltonicity, network flows, planarity, node and edge colorings, tournaments, matchings, and extremal graphs. A number of algorithms and applications are included.(F)
Prerequisites: MATH 3101.

MATH 4401. Operations Research. 3-0-3 Units.
Linear programming, the simplex method, network theory, game theory, Markov analysis, and other topics such as inventory analysis, queuing theory, integer programming.(S)
Prerequisites: MATH 2256.

MATH 4502. Statistics for Process Control. 3-0-3 Units.
Introduces application techniques used in quality/process control with particular application to area industries. Topics include probability, sampling distributions, control charts for variables and attributes, lot-by-lot sampling plans, acceptance sampling for variables, elementary reliability calculations, and an introduction to the concept of quality costs.(Fall Odd Years or As Needed)
Prerequisites: MATH 2181 or MATH2253 and MATH 1401 or MATH 2200 or MATH 4701 or BUSA 2850.

MATH 4511. Numerical Analysis I. 3-0-3 Units.
Numerical solution of equations, polynomial approximation, numerical differentiation and integration, numerical solutions of ordinary differential equations, error analysis. Written programs using algorithms. (F) Co-requisite: MATH 2403.
Prerequisites: CMPS 1301 or CMPS 1371.

MATH 4512. Numerical Analysis II. 3-0-3 Units.
Numerical solutions of systems of linear equations, numerical computations of eigenvalues and eigenvectors, error analysis. Written programs using the algorithms.(S)
Prerequisites: MATH 2256 and CMPS 1301 or CMPS 1371.

MATH 4601. Real Analysis I. 3-2-4 Units.
Develops a rigorous approach to functions of a real variable. Topics include limits, continuous functions, differentiation, and Riemann integration.(F)
Prerequisites: MATH 2255 and MATH 3101.

MATH 4602. Real Analysis II. 3-0-3 Units.
Continuous and rigorous approach to functions with an emphasis on functions in higher dimensions, including derivatives and integrals in n-dimensional Euclidean space.(S)
Prerequisites: MATH 4601.

MATH 4611. Complex Analysis. 3-0-3 Units.
Complex numbers, analytic functions, complex series, Cauchy theory, residue calculus, conformal mapping.(Summer)
Prerequisites: MATH 2255.

MATH 4701. Probability and Statistics I. 3-0-3 Units.
Sampling distributions, Normal, t, chi-square and F distributions. Moment generating function methods, Bayesian estimation and introduction to hypothesis testing.(F)
Prerequisites: MATH 2255.

MATH 4702. Probability and Statistics II. 3-0-3 Units.
Hypothesis testing, likelihood ration tests, nonparametric tests, bivariate and multivariate normal distributions.(S)
Prerequisites: MATH 4701.

MATH 4713. Prob & Stat for P-8 Teachers. 3-0-3 Units.
Provides special emphasis for teachers of grades P-8 on the fundamental concepts of probability and statistics with particular attention to specific methods and materials of instruction.(F,S,M)
Prerequisites: MATH 2008.

MATH 4800. Topology. 3-0-3 Units.
This course develops the concepts of open and closed sets, topological spaces, bases, subspaces, continuous functions, homeomorphisms, connected spaces and compact spaces.(F)
Prerequisites: MATH 3101.

MATH 4850. Mathematical Finance. 3-0-3 Units.
Introduces finance concepts from a mathematical perspective. Topics include the theory of pricing derivatives, the Black-Scholes model for pricing options, portfolio optimization, and capital asset pricing models.
Prerequisites: MATH 2770 or MATH 4701 with a grade of C or better on either math course.

MATH 4860. Internship In Mathematics. 0-0-1-4 Unit.
A supervised, credit-earning work experience of one academic semester with a previously approved business firm, private agency or government agency. Repeatable for a maximum of 4 credit hours. (F,S,M).
Prerequisites: Permission of department chair.

MATH 4900. Special Topics in Mathematics. 0-0-1-3 Unit.
Variable 1–3 hours. Advanced concepts in mathematics are presented, the content varies with the topic. The course may be repeated for credit when topic differs. Pre-requisite: MATH 3101 Intro to Advanced Mathematics and 2 additional upper level Mathematics courses excluding MATH 3703, 3803, and 4713. Approval of the Instructor is required before registration.(As Available)

MATH 4960. Research in Mathematics. 0-0-1-4 Unit.
Students will select a research topic, complete a written research proposal, and in association with a faculty mentor, execute the research plan. This course affords interested junior and senior students an opportunity to participate in a basic research experience with a member of the department faculty. The student will prepare both written and oral presentations of the work, and where appropriate, will be encouraged to make presentations at professional meetings or submit work to a journal for publication. (Dept. Chair Approval)(F,S,M as available)
Prerequisites: Permission of the faculty mentor.