Mathematics (MATH)

Courses

MATH 94. Elementary Algebra. 3 Credits.
Intended as a preparation for Math 101. Topics include: properties of real numbers, exponents and polynomials, simplifying variable expressions, linear equations and inequalities, factoring, graphing, and basic quadratic equations. Offered on a pass/no credit, non-degree credit basis only.
Fall and Spring.

MATH 97. Mathematics Study Skills. 1 Credit.
MATH 97 is a one credit course intended for students concurrently enrolled in MATH 99. This course will provide students with mathematics and problem-solving instruction and cover study skills strategies for succeeding in mathematics courses. Students will gain insights into how they learn mathematics through various activities and reflections. They will also receive any extra support needed so that they are successful in their MATH 99 course.
P: Concurrent enrollment in MATH 99
Fall and Spring.

MATH 99. Intermediate Algebra. 2 Credits.
Intended as a preparation for Math 101. Topics include: functions, linear equations, quadratic equations, set operations, Venn diagrams, polynomials, rational functions, rational exponents, radicals. Offered on a pass/no credit, non-degree credit basis only.
P: MATH 94 with a P grade or WPT-MFND score greater than 415
Fall and Spring.

MATH 100. Math Appreciation. 3 Credits.
An exploration of the exciting, rich, practical, historical, and creative nature of mathematics, while emphasizing reasoning skills and problem-solving abilities. Core material includes probability/statistics, rational and irrational numbers, infinity, and additional topics chosen from other areas of modern mathematics.
Fall and Spring.

MATH 101. Advanced Algebra. 2 Credits.
Absolute values, linear inequalities, system of linear equations in three variables, matrices, complex numbers, quadratic functions, exponential functions, logarithmic functions, sequences.
P: MATH 99 with a P grade or WPT-MFND test score > 465
Fall and Spring.

MATH 102. Quantitative Reasoning. 3 Credits.
This course is intended to develop analytic reasoning and the ability to solve quantitative problems. Topics to be covered include construction and interpretation of graphs, functional relationships, descriptive statistics, geometry and spatial visualization, math of finance, exponential growth, and basic probability. Appropriate use of units and dimensions, estimates, mathematical notation and available technology will be emphasized throughout the course.
P: MATH 94 with a P grade or WPT-MFND test score > 415
Fall and Spring.

MATH 104. Precalculus. 4 Credits.
Functions and their graphs, the algebra of functions, polynomial functions, rational functions, exponential and logarithmic functions, trigonometric functions, analytic trigonometry, conic sections
P: MATH 101 with at least a C grade or WPT-MFND score >465 and WPT-AALG score >525
Fall and Spring.

MATH 198. First Year Seminar. 3 Credits.
First Year Seminar, topics vary.
Reserved for New Incoming Freshman.

MATH 202. Calculus and Analytic Geometry I. 4 Credits.
Differential and integral calculus of the elementary functions with associated analytic geometry; transcendental functions; techniques of integration; application.
P: MATH 104 with at least a C grade or WPT-MFND score >465 and WPT-AALG score >525 and WPT-TAG score >525
Fall and Spring.

MATH 203. Calculus and Analytic Geometry II. 4 Credits.
Differential and integral calculus of the elementary functions with associated analytic geometry; transcendental functions; techniques of integration; application; sequences and series.
P: Math 202 with at least a C grade.
Fall and Spring.

MATH 209. Multivariate Calculus. 4 Credits.
Real-valued functions of several variables; tangent and normal lines; chain rule for partial derivatives; extrema; least squares method; higher-ordered derivatives; integration; polar and cylindrical coordinates; spherical coordinates; vector fields; line integrals; physical applications.
P: Math 203 with at least a C grade.
Fall and Spring.

MATH 260. Introductory Statistics. 4 Credits.
Using statistical software, this course covers descriptive statistics, probability, the normal distribution, estimation, hypothesis testing, confidence intervals, chi-square tests for categorical data, correlation, and simple linear regression.
P: MATH 101 or higher with at least a C, or WPT-MFND score > 465 and WPT-AALG score > 525
Fall and Spring.

MATH 299. Travel Course. 1-6 Credits.
Travel courses are conducted to various parts of the world and are led by one or more faculty members. May be repeated to different locations.
P: cons of instr & prior trip arr & financial deposit.

MATH 305. Ordinary Differential Equations. 4 Credits.
First-order differential equations, equilibrium solutions and stability, linear equations of higher order, Fourier series and periodic solutions, Laplace transform methods, first-order linear systems of differential equations with constant coefficients, eigenvalues and boundary value problems.
P: Math 203 with at least a C grade.
Fall and Spring.

MATH 306. Statistical Programming. 3 Credits.
This course is intended to teach critical concepts and develop skills in statistical programming, in conjunction with hands-on analysis of real-world datasets. Topics include data manipulation, handling different data types and data structures, data cleaning, exploratory data analysis and visualization, simulations, control structures, generating analytical reports, and tools for implementing reproducible research. R and SAS statistical software packages are introduced and used.
P: MATH 260 with at least a C grade
Spring.

MATH 314. Proofs in Number Theory and Topology. 3 Credits.
The skills necessary to read and write theoretical mathematics with basic material of Number Theory and Topology that will be needed for further study in theoretical mathematics.
P: Math 202 with at least a C grade; REC: Math 320.
Spring.

MATH 320. Linear Algebra and Matrix Theory. 4 Credits.
Matrices and vector space concepts, linear dependence and independence, systems of linear equations, linear transformations, determinants, eigenvalues and eigenvectors, orthogonality and least squares, symmetric matrices and quadratic forms, spectral decompositions.
P: MATH 202 with at least a C grade. REC: MATH 314
Spring.

MATH 323. Analysis. 4 Credits.
The real number system, sequences of real numbers and their generalizations to real-valued functions, series of real numbers, continuity of a function, the theory of differentiation, the theory and development of the Riemann integral, Picard's theorem.
P: Math 209 with at least a C grade and 314 with at least a C grade.
Fall Only.

MATH 328. Abstract Algebra. 3 Credits.
Groups, rings, and fields as organizing ideas. Basic structure theorems. Applications.
P: MATH 314 with at least a C grade and MATH 320 with at least a C grade
Fall Only.

MATH 329. Applied Regression Analysis. 4 Credits.
Techniques for fitting regression models are developed and applied to data using statistical software. Topics include simple linear regression, multiple regression, inference, regression diagnostics, remedial measures, model selection, logistic regression, and an introduction to nonlinear regression models.
P: MATH 260 with at least a C, MATH 306 with at least a C, and MATH 320 with at least a C
Fall Only.

MATH 355. Applied Mathematical Optimization. 3 Credits.
Introduction to mathematical optimization: mathematical modeling of optimization problems, analytical and numerical optimization techniques, applications. Linear programming: simplex method, duality, integer programming; nonlinear programming: Lagrange multipliers, Karush-Kuhn-Tucker optimality conditions, convexity; approximation techniques: line search methods, gradient methods, conjugate gradient methods; variational problems; dynamic programming; optimal control.
P: MATH 209 with at least a C grade AND MATH 320 with at least a C grade or concurrent enrollment
Spring.

MATH 360. Theory of Probability. 3 Credits.
Probability concepts and counting techniques; expected value; discrete, continuous, and multivariate probability distributions; moments and moment-generating functions; transformations and functions of random variables; and the Central Limit Theorem.
P: Math 209 with at least a C grade.
Fall Even.

MATH 361. Mathematical Statistics. 3 Credits.
Properties of point estimators (bias, consistency, sufficiency), methods of estimation (method of moments, maximum likelihood estimation), hypothesis testing and interval estimation, power, likelihood ratio tests, chi-square tests, and nonparametric statistics.
P: MATH 360 with at least a C grade
Spring Odd.

MATH 385. Foundations of Geometry. 3 Credits.
Intuitive and deductive introductions to Euclidean, non-Euclidean, transformation, fractal, and projective geometries and their applications
P: Math 314 with at least a C grade.
Spring.

MATH 406. Partial Differential Equations. 3 Credits.
Classification of partial differential equations; solution of standard partial differential equations - transport equation, Laplace's equation, Poisson's equation, heat equation, wave equation; method of characteristics, initial and boundary value problems, separation of variables, Sturm-Liouville theory, integral transform methods, d'Alembert formula, Green's functions, numerical solutions, applications in science and engineering.
P: MATH 209 with at least a C grade and MATH 305 with at least a C grade.
Spring Odd.

MATH 410. Complex Analysis. 3 Credits.
Algebra and geometry of complex numbers; analytic functions, elementary transformations, integration, Taylor and Laurent series, contour integration, residues, conformal mapping.
P: Math 209 with at least a C grade.
Spring Even.

MATH 430. Design of Experiments. 4 Credits.
Statistical theory and practice underlying the design of scientific experiments, and methods of analysis. Replication, randomization, error, linear models, least squares, crossed and nested models, blocking, factorial experiments, Latin squares, confounding, incomplete blocks, split-plots.
P: MATH 202 with at least a C, MATH 260 with at least a C, and MATH 306 with at least a C.
Spring Even.

MATH 431. Multivariate Statistical Analysis. 4 Credits.
Principles and practice in the analysis of multivariate data. Correlation, partial correlation, principle components, factor analysis, discriminant functions, canonical correlation, cluster analysis, multidimensional scaling. Emphasis on computer analysis of actual data.
P: MATH 260 with at least a C, MATH 306 with at least a C, MATH 320 with at least a C, and MATH 329 with at least a C
Spring Odd.

MATH 478. Honors in the Major. 3 Credits.
Honors in the Major is designed to recognize student excellence within interdisciplinary and disciplinary academic programs.
P: min 3.50 all cses req for major and min gpa 3.75 all UL cses req for major.
Fall and Spring.

MATH 492. Special Topics in Mathematics. 1-4 Credits.
This course brings together students and professors who have a mutual interest in some topic not otherwise available among the usual mathematics and statistics offerings.

MATH 495. Teaching Assistantship. 1-6 Credits.
The student and supervising teacher must prepare a statement that identifies the course with which the assistantship will happen, objectives for the assistantship, and expectations in order to fulfill the course objectives. Students are not eligible to receive credit in both the course they assist the instructor with and the teaching assistantship in the same semester. Typically student has previously taken the course prior to enrollment in the assistantship. Course is repeatable for credit.
Fall and Spring.

MATH 497. Internship. 1-12 Credits.
Supervised practical experience in an organization or activity appropriate to a student's career and educational interests. Internships are supervised by faculty members and require periodic student/faculty meetings. Course is repeatable for credit.
P: jr st.
Fall and Spring.

MATH 498. Independent Study. 1-4 Credits.
Independent study is offered on an individual basis at the student's request and consists of a program of learning activities planned in consultation with a faculty member. A student wishing to study or conduct research in an area not represented in available scheduled courses should develop a preliminary proposal and seek the sponsorship of a faculty member. The student's advisor can direct him or her to instructors with appropriate interests. A written report or equivalent is required for evaluation, and a short title describing the program must be sent early inthe semester to the registrar for entry on the student's transcript.
P: fr or so st with cum gpa > or = 2.50; or jr or sr st with cum gpa > or = 2.00.
Fall and Spring.

MATH 499. Travel Course. 1-6 Credits.
Travel courses are conducted to various parts of the world and are led by one or more faculty members. May be repeated to different locations.
P: cons of instr & prior trip arr & financial deposit.