

Mathematics Courses

Mathematics

WCSAM 203 Linear Algebra (4)

Linear algebra is a foundational subject for almost all areas of pure and applied mathematics. This course will include systems of linear equations and their representations as matrices, matrix algebra, vector spaces and subspaces in R^n , eigenvalues and eigenvectors, least squares, and the simplex method. There will be a heavy emphasis on applications and numerical techniques implemented with standard scientific programming languages. This course emphasizes critical, analytical, and integrative thinking as well as writing and other communication skills. This course does not have a specific prerequisite, but students enrolling in this course need to be ready for college-level mathematics.

WCSAM 400 Science Capstone (2)

This capstone seminar provides students with an opportunity to extend their learning through designing and conducting an interdisciplinary science capstone project in small teams. Students will learn how to develop and complete collaborative STEM (science, technology, engineering, and mathematics) research projects, and present their work both on campus and in the local community. This course is designed to complement senior projects within students' majors, and satisfies the WCore Capstone requirement. (WCore: SC)

MATH 101 Fundamentals of Algebra (4)

This course, which uses active, inquiry based learning, will help students become more comfortable with the fundamentals of algebra through the study of mathematical models and their applications in real-life situations. This course will prepare students for future mathematics classes such as MATH 144, Functions Modeling Change.

MATH 144 Functions Modeling Change (4)

Mathematical models are representations that approximate real-world systems. This course introduces students to important classes of models (linear, quadratic, exponential, logarithmic, and trigonometric) that are commonly used to describe phenomena across many disciplines. Students will develop algebraic skills in the service of modeling, solving, and forecasting.

MATH 200/300 Special Topics in Mathematics (1-4)

Special courses offered when there is sufficient demand.

MATH 201 Calculus I (4)

Functions, graphs and limits. Differential calculus of algebraic, trigonometric, exponential, and logarithmic functions with applications to geometry, the physical and life sciences, and economics.

MATH 202 Calculus II (4)

Integral calculus of algebraic, trigonometric, exponential, and logarithmic functions with applications to geometry, the physical and life sciences, and economics. Sequences and series. Taylor's theorem. Introduction to differential equations.

MATH 203 Multivariate Calculus (4)

Vectors in n -space, differential calculus in several variables, vector fields, integration and its applications in several variables, line, surface, volume, and flux integrals. Green's, Stokes', and the divergence theorems.

MATH 210 Discrete Mathematics (4)

Discrete mathematics is an "introduction to proof" course. We will learn basic proof techniques such as direct proof, proof by induction, proof by contradiction, and proof by contrapositive and apply them to "discrete" mathematical objects like sets, sequences, and graphs. We'll also study combinatorics, propositional logic, and functions and relations. We hope to help you learn to communicate mathematics effectively and to explore what happens in a discrete world.

MATH	308	Putnam Seminar	(1)
Preparation for the William Lowell Putnam Mathematical competition. May be taken twice for credit.			
MATH	310	Probability and Statistics	(4)
Introduction to probability theory including combinatorial analysis, conditional probability, discrete and continuous random variables, expectation and variance, jointly distributed random variables, and sampling theory.			
MATH	311	Linear Algebra II	(4)
Rigorous treatment of general vector spaces, linear transformations, eigenvalues and eigenvectors building on the material in Linear Algebra.			
MATH	312	Abstract Algebra	(4)
Abstract algebra develops a language and system for studying mathematical objects and the algebraic relationships between them. For example, numbers and arithmetical operations are seen as special cases of more general structures called groups, rings, and fields. This is a rigorous, proof-based course. It is strongly recommended that students take one or more upper-division math courses and have junior or senior standing before registering for Abstract Algebra.			
MATH	314	Foundations of Geometry	(4)
Modern axiomatic development of plane geometry and related systems. Includes investigation of finite geometry and hyperbolic geometry.			
MATH	321	Advanced Calculus	(4)
Advanced Calculus begins with an axiomatic foundation for the real number system and proves theorems that form the basis of calculus. Topics include point-set topology of the real numbers, a treatment of limits for sequences and functions, continuity, and differentiability. This is a rigorous, proof-based course. It is strongly recommended that students take one or more upper-division math courses and have junior or senior standing before registering for Advanced Calculus.			
MATH	323	Complex Analysis	(4)
Functions of one complex variable, analyticity, Cauchy-Riemann equations, derivatives and integrals of complex functions, complex series, and residue theory.			
MATH	341	Topology	(4)
An introduction to topology. Topics include open and closed sets, continuity, compactness, quotient spaces, and product spaces. Applications of topology may include metric topology, knot theory, classification of surfaces, and the fundamental group.			
MATH	362	Topics in Applied Mathematics	(4)
A range of applied mathematics topics building on a foundation of linear algebra, differential equations, and discrete mathematics. Possible topics include optimization, numerical analysis, algorithm analysis and design, algorithms on graphs and trees, math modeling, signal processing, and dynamical systems. May be taken for credit more than once with instructor's approval.			
MATH	363	Differential Equations	(4)
Differential equations are used to describe phenomena that involve change. This course includes solutions of first- and second-order differential equations with a focus on analytic, numerical, and qualitative analysis of systems of linear and non-linear differential equations. Other topics may include Laplace transforms, power series methods, Fourier series methods, and topics from partial differential equations. Applications may be drawn from physics, chemistry, biology, and the social sciences.			
MATH	387	Undergraduate Teaching	(1)
For teaching assistants in lower division mathematics problem-solving courses. A maximum of two credit hours of MATH 387 may be applied toward the major or minor. Requires consent of program director. This course is repeatable for credit.			

MATH 401 Directed Studies (1-4)

A tutorial-based course used only for student-initiated proposals for intensive individual study of topics not otherwise offered in the Mathematics program. Requires consent of instructor and school dean. This course is repeatable for credit.

MATH 440 Internship (1-8)

Offers students the opportunity to integrate classroom knowledge with practical experience. Prerequisites: junior or senior standing (for transfer students, at least 15 hours completed at Westminster or permission of instructor), minimum 2.5 GPA, and consent of program director and Career Center internship coordinator. This course is repeatable for credit.

MATH 485 Senior Seminar (2)

This class will collaboratively review the core areas of undergraduate mathematics and build a more complete and integrated view of mathematics. All students will be required to take the Mathematics ETS exam at the conclusion of the course. Teaching and academic majors must register for the Senior Seminar during the spring semester of their senior year. Students who will be student teaching during that semester may take it the previous year. Requires Senior standing and graduation expected by the following December or permission of the instructor. (WCore: SC)