

COURSE DESCRIPTIONS

MATH 101	Fundamentals of Algebra	4 CREDITS	MATH 321	Advanced Calculus	4 CREDITS
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.			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 144	Functions Modeling Change	4 CREDITS	MATH 323	Complex Analysis	4 CREDITS
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.			Functions of one complex variable, analyticity, Cauchy-Riemann equations, derivatives and integrals of complex functions, complex series, and residue theory.		
MATH 200	Special Topics	1 to 4 CREDITS	MATH 341	Topology	4 CREDITS
Prerequisite: consent of mathematics faculty. Offered on sufficient demand.			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 201	Calculus I	4 CREDITS	MATH 362	Topics in Applied Mathematics	4 CREDITS
Functions, graphs and limits. Differential calculus of algebraic, trigonometric, exponential, and logarithmic functions with applications to geometry, the physical and life sciences, and economics.			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, dynamical systems, and statistical learning theory. May be taken for credit more than once with instructor's approval.		
MATH 202	Calculus II	4 CREDITS	MATH 363	Differential Equations	4 CREDITS
Integral calculus of algebraic, trigonometric, exponential, and logarithmic functions with applications to geometry, the physical and life sciences, and economics. Sequences and series. Taylors theorem.			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 203	Multivariate Calculus	4 CREDITS	MATH 370	Machine Learning	4 CREDITS
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.			Machine learning is the study of algorithms that use data to make predictions. Such algorithms are at the heart of diverse applications like pattern recognition, spam filtering, web searching, data mining, and artificial intelligence. This course deals with the theory and application of machine learning techniques, including such topics as perceptrons, hyperplane classification and regression, decision trees, support vector machines as Lagrangian duals, conjugate gradient descent, backpropagation training for artificial neural networks, and linear and quadratic optimization.		
MATH 210	Discrete Mathematics	4 CREDITS	MATH 387	Undergraduate Teaching	1 CREDIT
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.			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 300	Special Topics in Mathematics	1 to 4 CREDITS	MATH 401	Directed Studies	1 to 4 CREDITS
Special courses offered when there is sufficient demand.			A tutorial-based course used only for student- initiated proposals for intensive individual study of topics not otherwise offered in the Mathematics Program. Requires junior or senior standing and consent of instructor and school dean. This course is repeatable for credit.		
MATH 308	Putnam Seminar	1 CREDIT	MATH 440	Internship	1 to 8 CREDITS
Preparation for the William Lowell Putnam Mathematical competition. May be taken twice for credit.			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, completion of the Career Resource Center Internship Workshop, and consent of program director and Career Center Internship Coordinator. This course is repeatable for credit. REGISTRATION NOTE: Registration for internships is initiated through the Career Center website and is finalized upon completion of required paperwork and approvals. More info: 801-832-2590 https://westminstercollege.edu/internships		
MATH 310	Probability and Statistics	4 CREDITS			
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 CREDITS			
Rigorous treatment of general vector spaces, linear transformations, eigenvalues and eigenvectors building on the material in Linear Algebra.					
MATH 312	Abstract Algebra	4 CREDITS			
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 CREDITS			
Modern axiomatic development of plane geometry and related systems. Includes investigation of finite geometry and hyperbolic geometry.					

