

MATHEMATICS

MATH 100 (3 cr hrs)

Elementary Algebra

This course is an introduction to the effective algebra and graphing skills which can be used to promote academic success in college (as determined by either an individual student's decision, by ACT score, or by the Computer Placement Test). Units to be covered include real numbers, linear equations, polynomials, rational expressions, exponents and radicals and quadratic equations. Each topic is also applied to word problems. This course earns students institutional credit but does not fulfill General Studies requirements. Math 100 is open to all students who have not successfully completed a higher level mathematics class.

MATH 110 (3 cr hrs)

Elements of Mathematics

This course is designed to give the non-mathematical student the opportunity to use basic operations, succeed in mathematical modeling and understand deductive and inductive reasoning. The general concepts covered will include sets, logic, the number system (natural numbers through the reals), equations, inequalities, problem solving, graphs, functions, and geometry.

ACT Math 17 or greater, SAT 530 or greater or Math 100

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 112 (3 cr hrs)

College Algebra

This course is for students who specifically need algebra in certain pre-professional programs. It covers algebraic principles and processes.

ACT Math 17 or greater, SAT 530 or greater or Math 100

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 114 (3 cr hrs)

Trigonometry

This course satisfies the Quantitative Reasoning requirement for General Studies. The course will build from basic knowledge of algebra and geometry toward a solid understanding of the approach to both doing mathematics and applying mathematics, specifically, in making connections between branches of mathematics. Topics include: the unit circle, trigonometric functions (definitions, graphs and inverses), right triangles, oblique triangles, trigonometric identities, trigonometric equations, the trigonometric form of complex numbers, vectors, polar coordinates, polar graphs, and parametric equations.

MATH 225 (5 cr hrs)

Calculus with Analytic Geometry I

This course includes the study of analytic geometry, functions, rates of change, limits, continuity, related rates, rules for differentiation, differentiation of trigonometric, logarithmic, and exponential functions, maxima and minima, higher order derivatives, techniques of graphing, applications of the derivative, antiderivatives, the definite integral, the Fundamental Theorem of Calculus, and basic integration theory with applications.

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 226 (5 cr hrs)

Calculus with Analytic Geometry II

This course includes the study of further techniques in integration, infinite limits, improper integrals, in-depth applications of definite integrals, infinite sequences and series, tests for convergence, as well as an introduction to vectors and the geometry of space.

Prerequisite Required: MATH 225

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 230 (3 cr hrs)

Foundations of Mathematical Thought

This course is an introduction to the theoretical aspects of mathematics. Students will explore axiomatic foundations of sets, functions and logic. Various methods and styles of proofs will be discussed. Students will learn to write proofs of various types using proper mathematical style and proper writing style.

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 304 (3 cr hrs)**Modern Geometry**

This course covers the modern approach to geometric concepts with emphasis in both the axiomatic approach to geometry and the use of modern technology to work with geometric concepts. Topics covered will include finite geometries, geometric transformations, synthetic geometry, geometric constructions, and non-Euclidean geometries.

Prerequisite Required: MATH 230

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 306 (3 cr hrs)**Modern Algebra**

This course is a study of the various algebraic systems arising in modern mathematical computations. Emphasis is placed on the axiomatic approach to algebra and the use of modern technology to work with algebraic concepts. Topics covered will include sets, mappings and operations, relations, groups, rings, domains, development of the real number system, and development of the complex number system.

Prerequisite Required: MATH 230

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 327 (3 cr hrs)**Calculus with Analytic Geometry III**

This course includes the study of Parametric equations and polar coordinates, conic sections, an introduction to vector calculus, and the study of multivariable calculus including partial derivatives, optimization, and the double and triple integrals with applications.

Prerequisites Required: MATH 225, MATH 226

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 328 (3 cr hrs)**Differential Equations**

This course will review differentiation and integration. Solutions and methods for solving first and second order ordinary differential equation will be discussed and applied.

Prerequisite Required: MATH 327

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 404 (3 cr hrs)**Mathematical Modeling**

This course covers a variety of mathematical topics ranging from graphs and networks to linear programming. The emphasis of the course is on modeling process used to set up and solve problems in these topic areas. Strengths and limitations of the mathematical modeling technique will be discussed. Analysis and critique of traditional word problems will also be discussed.

Prerequisite Required: MATH 225

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 418 (3 cr hrs)**Linear Algebra**

This course presents systems of linear equations, determinants, vector spaces, inner product spaces, linear transformations, eigenvalues and eigenvectors with moderate emphasis on proof. Applications of these concepts are also covered.

Prerequisite Required: MATH 230

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 420 (3 cr hrs)**Advanced Calculus**

This course provides a theoretical foundation for the concepts of elementary calculus. Topics include real number system, topology of the real line, limits, continuity, differentiation, integration, convergence and uniform convergence of infinite series, and improper integrals.

Prerequisites Required: MATH 226 and MATH 230

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 430 (3 cr hrs)**Discrete Structures**

A study of some of the mathematical concepts useful to the computer boolean algebra, logic circuits, vectors, matrices, determinants, graphs, directed graphs, finite machines, and automata.

Prerequisites Required: MATH 230 and MATH 113 or MATH 120

Generals Studies Outcome: Collegiate Skills - Effective Communication

MATH 490 (1 cr hrs)**Seminar in Mathematical Research**

This course consists of a review of current research trends in mathematics. Each student will review current literature and select and pursue a topic of individual study. Mathematics faculty will mentor and grade the participants in the course. This course is to be taken during the student's last year of study at Peru State College. This course is the capstone course and senior competency for the Mathematics major.

Prerequisite Required: Seniors Only