MATHEMATICS (MATH)

MATH 102 | Survey of Mathematics | 4 cr

Covers topics selected from review of algebra fundamentals, sets, logic, number theory, geometry, consumer math, linear and exponential modeling, math and the arts, voting methods, probability, and statistics. Intended for students who need no further mathematics courses beyond competency.
Prerequisites: Appropriate placement.
Offered: Fall, Spring.
Meets: Computational Skills, Computational Skills

MATH 103 | Elementary Statistics | 4 cr

Introduces modern statistics including statistics and data, displaying descriptive statistics, measures of central tendency and dispersion, probability and counting, the binomial and normal probability distributions, sampling and sampling distributions, confidence intervals, hypothesis testing; and correlation and regression. Not open to students with credits in any of these courses: BIOS 210, GEOS 295, MATH 203, POLS 200, PSYC 250, QM 210, 310, SOCA 250, 295 or 300. Four-hour lecture.
Prerequisites: Appropriate placement.
Offered: Fall, Spring.
Meets: Natural Science: MATH

MATH 104 | Quantitative Reasoning | 4 cr

Covers topics from college algebra (such as functions, linear, exponential and logarithmic models), statistics, and graphing. Emphasizes proportional reasoning, modeling, problem-solving and applications. Designed for students whose program does not require further coursework in pre-calculus or calculus. Four-hour lecture.
Prerequisites: Appropriate placement.
Offered: Fall, Spring.
Meets: Computational Skills, Computational Skills

MATH 105AX | Business Algebra Fundamentals | 2 cr

Models business scenarios using algebraic techniques and analysis to help solve business problems and make predictions. Successfully completing MATH 105AX, MATH 105BX, and MATH 105CX satisfies the UW-P computational skills requirement for flexible option students.
Prerequisites: Admission to the Flexible Option Program and consent of program representative.

MATH 105BX | Money in the Bank: Application of Exponential and Logarithmic Functions | 1 cr

Covers evaluation of investment options, including factors such as interest rate, compounding period, and length of contract. Applies exponential and logarithmic functions to determine the best investment options. Successfully completing MATH 105AX, MATH 105BX, and MATH 105CX satisfies the UW-P computational skills requirement for flexible option students.
Prerequisites: MATH 105AX; admission to the Flexible Option Program and consent of program representative.

MATH 105CX | Application of Algebraic Methods to Model and Solve Business Problems | 1 cr

Models business scenarios using algebraic methods. Identifies and applies the best method to solve the business problems. Successfully completing MATH 105AX, MATH 105BX, and MATH 105CX satisfies the UW-P computational skills requirement for flexible option students.
Prerequisites: MATH 105BX; admission to the Flexible Option Program and consent of program representative.

MATH 111 | College Algebra I | 5 cr

Explores linear equations, single and compound inequalities, and absolute value equations and inequalities; equations of lines and linear systems; exponential and polynomial operations with function evaluation; polynomial factoring by combinations of GCF, grouping, trinomial including quadratic-in-form, difference of squares, and sum and difference of cubes; quadratic and higher-degree equations by factoring; rational operations and equations; variation; radical operations and equations with up to two radical terms; complex numbers; completing the square and quadratic formula for quadratic equations; general polynomial equations; quadratic functions with graphing; introduction to exponential and logarithmic functions and equations.
Prerequisites: Appropriate placement.
Offered: Fall, Spring.
Meets: Computational Skills, Computational Skills

MATH 112 | College Algebra II | 4 cr

Explores functions and graphs, polynomial functions, exponential and logarithmic functions, sequences, series, induction and combinatorics. Four hour lecture.
Prerequisites: MATH 111 with C or better; or equivalent; or appropriate placement.
Offered: Fall, Spring.

MATH 113 | Trigonometry | 2 cr

Introduces trigonometry with applications including angular and circular definitions of trigonometric functions, graphing, use of fundamental identities.
Prerequisites: MATH 112 or equivalent or concurrent registration.
Offered: Fall, Spring.

MATH 114 | College Algebra II/Trigonometry | 5 cr

Covers functions and graphs, polynomials and rational functions, exponential and logarithmic functions, trigonometric functions, trigonometric identities and equations, applications, sequences, series. Not open to those with credit in MATH 112 or 113.
Prerequisites: MATH 111 with C or better; or equivalent, or appropriate placement; not open to those with credit in MATH 112 or MATH 113.
Offered: Fall, Spring.

MATH 203 | Intermediate Statistics | 3 cr

Introduces inferential statistics including elementary combinatorics and probability, binomial and normal distributions, Central Limit Theorem, estimation, confidence intervals, hypothesis testing, correlation, regression, chi-square distribution, and analysis of variance.
Prerequisites: Successful completion of Computational Skills requirement.
Offered: Spring.

MATH 215 | Math for Middle Childhood Through Early Adolescence Teachers I | 3 cr

Topics include the development of the algorithms of arithmetic, numeration systems, problem solving, number theory and set theory.
Prerequisites: MATH 111 with grade of C or better or consent of instructor.
Offered: Occasionally.

MATH 216 | Math for Middle Childhood Thru Early Adolescence Teachers II | 3 cr

Topics include introductory geometry, constructions, congruence, similarity, motion geometry, concepts of measurements, probability and statistics.
Prerequisites: MATH 215.
Offered: Occasionally.

MATH 221 | Calculus and Analytic Geometry I | 5 cr
Explains rate of change and limits, differentiation, applications of the derivative, integration, applications of the integral and transcendental functions.
Prerequisites: MATH 112 and MATH 113 or equivalent; or appropriate placement.
Offered: Fall, Spring.
Meets: Natural Science: MATH

MATH 222 | Calculus and Analytic Geometry II | 5 cr
Examines methods of integration, analytic geometry, polar coordinates, hyperbolic functions, infinite series, power series, and introduces ordinary differential equations.
Prerequisites: MATH 221.
Offered: Fall, Spring.
Meets: Natural Science: MATH

MATH 223 | Calculus and Analytic Geometry III | 5 cr
Explains vectors and parametric equations, vector functions and their derivatives, partial and directional derivatives, multiple integrals, vector analysis, Green's Theorem and Stokes' Theorem.
Prerequisites: MATH 222.
Offered: Fall.

MATH 231 | Discrete Mathematics | 3 cr
Covers sets; the number system; Boolean algebra; formal logic and proofs; relations and functions; combinatorics and recurrence relations; graphs and trees. Cross-listed with: CSCI 231.
Prerequisites: MATH 112 with a C or better.
Offered: Fall, Spring.

MATH 290 | Special Topics in Mathematics | 1-4 cr
Selected topics in mathematics will be examined.
Prerequisites: None.
Offered: Occasionally.

MATH 301 | Linear Algebra | 4 cr
Introduction to linear algebra including systems of equations, matrices, determinants, vector spaces and linear transformations, and diagonalization.
Prerequisites: MATH 223; or MATH 222 and consent of instructor.
Offered: Fall.

MATH 303 | Set Theory, Logic and Proof | 4 cr
Examines elementary propositional and predicate logic; language and axioms of set theory; operations on sets; well-orderings, ordinals, transfinite induction and recursion; cardinals; the axiom of choice; combinatorics; reading and writing of proofs in mathematics. Cross-listed with: PHIL 303.
Prerequisites: MATH 222; or PHIL 201 and consent of instructor.
Offered: Fall.

MATH 309 | Probability and Statistics | 3 cr
Covers elementary probability, random variables, properties of distributions, sampling, queuing theory, central limit theorem and law of large numbers. Cross-listed with: CSCI 309.
Prerequisites: MATH 221 with a C or better.
Offered: Spring.

MATH 310 | Advanced Probability Theory and Statistics | 4 cr
The main mathematical methods and techniques of probability theory; random variables, expected values, variance, central limit theorem, parameter estimation and hypothesis testing.
Prerequisites: MATH 223.
Offered: Fall.

MATH 317 | Differential Equations and their Applications | 4 cr
Examines first- and second-order differential equations and applications; higher-order linear differential equations; series solutions of second-order differential equations; Laplace transforms; matrix algebra, systems of equations, eigen values and eigenvectors; systems of differential equations; and partial differential equations.
Prerequisites: MATH 222.
Offered: Fall.

MATH 331 | Logic and Combinatorics | 3 cr
Permutations and combinations, graphs, trees, mathematical induction, propositional calculus, Mathematica and its applications in combinatorics, number theory and linear programming. Intended for students working for teaching certification in Mathematics.
Prerequisites: MATH 222.

MATH 350 | Advanced Calculus | 4 cr
Covers the fundamental notions of limits, continuity, uniform continuity, derivative, and integral. Examines infinite series with a study of convergence and uniform convergence.
Prerequisites: MATH 223, MATH 303.
Offered: Spring.

MATH 361 | Foundations of Geometry | 3 cr
Introduction to axiomatic geometry including Euclidean, non-Euclidean, and projective geometries.
Prerequisites: MATH 222.

MATH 367 | Elementary Number Theory | 4 cr
Prime numbers, fundamental theorem of arithmetic, congruence, quadratic residues and quadratic reciprocity, number theoretic functions and diophantine equations.
Prerequisites: MATH 222.

MATH 368 | Mathematical Modeling | 3 cr
Surveys mathematical models, models involving differential equations, probabilistic models, Markovian-models, simulation, and Monte Carlo methods. Cross-listed with: CSCI 368.
Prerequisites: MATH 222; PHYS 241 or CSCI 130; or consent of instructor.
Offered: Yearly.

MATH 373 | History of Mathematics | 3 cr
Main lines of mathematical development from the Babylonians, Egyptians and Greeks to the present day; the lives of great mathematicians: Euclid, Archimedes, Descartes, Newton, Gauss, Cantor.
Prerequisites: MATH 221 or consent of instructor.
Offered: Occasionally.

MATH 401 | Applied Mathematics | 3 cr
Explores traditional analytical and numerical methods enriched by modern mathematical developments and applications to various fields such as ocean and atmospheric sciences. Combines approximate forms of the basic mathematical equations of motion with analysis.
Prerequisites: MATH 223 and MATH 317.
Offered: Fall (odd years).

MATH 423 | Complex Analysis | 4 cr
Examines elementary functions of a complex variable; analytic -functions; complex integrals and residue theory; conformal mapping; applications to electrostatics and hydrodynamics.
Prerequisites: MATH 223, MATH 303.
Offered: Spring.

MATH 441 | Abstract Algebra | 4 cr
A study of group theory which includes subgroups, normal subgroups, isomorphisms, quotient groups, Cayley's Theorem, and Lagrange's Theorem. Provides an introduction to ring theory which includes subrings, ideals and factor rings, and polynomial rings.
Prerequisites: MATH 301, MATH 303 or consent of instructor.
Offered: Fall.

MATH 451 | Topology | 4 cr
Introduction to the theory of topological spaces, metric spaces, continuous functions, 2-dimensional manifolds, and the concept of the fundamental group.
Prerequisites: MATH 301, MATH 303.
Offered: Spring.

MATH 461 | Differential Geometry | 3 cr
Local theory of curves and surfaces, curvature tensors, and global theory of surfaces.
Prerequisites: MATH 301 and MATH 350.
Offered: Occasionally.

MATH 490 | Special Topics in Mathematics | 1 cr
Intensive treatment of various specialized areas of mathematics.
Prerequisites: Instructor consent.
Offered: Occasionally.

MATH 495 | Senior Seminar | 1-2 cr
Research and presentation of selected topics from the mathematical literature.
Prerequisites: Senior standing and consent of instructor.
Offered: Fall.

MATH 499 | Independent Study | 1-4 cr
Prerequisites: Consent of instructor and department chair.
Offered: Occasionally.