MATHEMATICS (MTH) CPSO

Visit the Course Schedule Search website to find out when courses will be offered during the academic year.

Read more about the courses within this subject prefix in the descriptions provided below.

MTH 801 - Probability and Statistics
Credits: 4
In this course students study topics in data analysis including descriptive and inferential statistics, probability, odds and fair games, probability distributions, normal distributions, and estimation. Among the topics are numerical and graphical summaries for one and two variables, linear regression and correlation, confidence intervals and tests concerning means, sampling and experimentation, basic probability, confidence intervals, hypothesis testing, sampling distributions, two-sample t-tests for means, chi-squared tests, regress and correlation, and possible other topics. A standards statistical software package is used throughout the course to support the course format that includes: hands-on activities; computer-based simulations; creating and implementing student developed investigations; and actual secondary and middle school mathematics classroom activities. Throughout the course students are given opportunities to relate the mathematical concepts studied in this course to the mathematical concepts they will be teaching. Successful completion of PreCalculus required.
Equivalent(s): MATH 703G
Mutual Exclusion: No credit for students who have taken MATH 823.
Grade Mode: Letter Grading

MTH 802 - Mathematical Proof for Educators
Credits: 4
This course introduces students to the language and methods used to create and write mathematical proofs and solve problems. Methods of proof will include: direct, contrapositive, contradiction, and induction. Methods of problem solving will be based on Polya's four steps for solving problems. Students will learn about and utilize the many functions of proof including: verification, explanation, communication, discovery, justification, and inquiry. The course will also explore the relationship between problem solving and the process of proving. Students will explore fundamental abstract concepts in mathematics chosen from the following areas: functions and relations, set theory, number theory, and logic, Euclidian and non-Euclidian geometry, algebra, mathematical reasoning, proof, and problem solving. Connections to middle and secondary school mathematics curriculum emphasized. Students enrolled in this course at the 700 level will meet additional academic requirements including an applied project. Pre-calculus required prior to taking this course.
Equivalent(s): MATH 700G
Grade Mode: Letter Grading

MTH 803 - Number Systems
Credits: 4
This course examines the structure and properties of mathematics while focusing on the development of mental mathematics strategies and problem solving skills. Topics include sets, functions, applications of rational numbers, integers, fractions, decimals, percentages, and number theory. Appropriate grade level techniques are utilized to investigate algorithms, probability and statistics, counting techniques, scientific notation, complex numbers, exponents, geometry, and measurement. Students will also investigate ratios, proportion, data analysis, patterns, and the connections to algebra and geometry topics in the context of the 5-12 grades mathematics curriculum. Successful completion of PreCalculus required prior to taking this course.
Equivalent(s): MATH 701G
Mutual Exclusion: No credit for students who have taken MATH 821.
Grade Mode: Letter Grading

MTH 804 - Geometric Structures for Teachers
Credits: 4
This course will examine concepts in Euclidean and non-Euclidean geometries. Course topics include area and volume, two- and three-dimensional perspective, congruence and similarity, properties of and relationships among geometric shapes and structures. Students will investigate graphing, vectors, motion and symmetry. Students engage in course concepts through proofs, problem solving, dynamic geometric software, and through activities used in secondary and middle school mathematics. Throughout the course students will be given opportunities to relate the mathematical concepts studied to the mathematical concepts they will be teaching. Successful completion of PreCalculus required prior to taking this course.
Equivalent(s): MATH 702G
Mutual Exclusion: No credit for students who have taken MATH 822.
Grade Mode: Letter Grading

MTH 805 - Calculus I
Credits: 4
The first semester of a calculus sequence dealing with applications and modeling of the differential and integral calculus. Course will focus on functions and their graphs, limits, continuity, differentiation, integration, the derivative and its uses in optimization and mathematical modeling, as well as the Fundamental Theorem. Throughout the course students will be given opportunities to relate the mathematical concepts studied to the mathematical concepts they will be teaching. Graphing calculators are used throughout the course to explore and represent concepts. Students enrolled in this course at the 700 level will meet additional academic requirements including an applied project. Pre-calculus required prior to taking this course.
Equivalent(s): MATH 706G
Grade Mode: Letter Grading

MTH 806 - History of Mathematics
Credits: 4
This course addresses the historical development of major themes in mathematics, including calculation, numbers, geometry, algebra, infinity, and formalism in various civilizations ranging from the antiquity of Babylonia and Egypt through classical Greece, the Middle and Far East, and on to modern Europe. The course emphasizes how earlier civilizations influenced or failed to influence later ones and how the concepts evolved in these various civilizations.
Prerequisite(s): MTH 805 with a minimum grade of B- or MATH 706G with a minimum grade of B-.
Equivalent(s): MATH 708G
Grade Mode: Letter Grading

MTH 807 - Calculus II
Credits: 4
This course is the second semester of a calculus sequence dealing with applications of differential and multivariable calculus. Topics include the calculus of transcendental functions, applications of integration, some differential equations, sequences and series, differentiation and integration of trigonometric functions multidimensional calculus with applications, and an introduction to multivariable calculus. Throughout the course students are given opportunities to relate the mathematical concepts studies to the mathematical concepts they will be teaching. Graphing calculators are used throughout the course to explore and represent concepts.
Prerequisite(s): MTH 805 with a minimum grade of B- or MATH 706G with a minimum grade of B-.
Equivalent(s): MATH 707G
Grade Mode: Letter Grading

MTH 808 - Discrete Mathematics
Credits: 4
This course is designed to introduce students to discrete and abstract mathematical topics. Topics include propositional and predicate logic; elementary set theory; introduction to proof techniques including mathematical induction; sets, relations, functions, and relations; recurrence relations, graph theory, as well as the properties of groups, rings, and fields. Students study number systems, mathematical induction, algorithms and complex number systems, matrix manipulation, combinatorics, graph theory, and finite differences. Course activities are based on secondary and middle school mathematics curricula. This course considers the basic objects of mathematics through real-world examples and the methods used to elucidate their properties.
Prerequisite(s): MTH 805 with a minimum grade of B- or MATH 706G with a minimum grade of B-.
Equivalent(s): MATH 705G
Grade Mode: Letter Grading

MTH 809 - Topics in Linear and Abstract Algebra
Credits: 4
This course will examine concepts in algebra including: Patterns and functions, arithmetic sequences, geometric sequences, arithmetic and algebra of the integers, least common multiple and greatest common divisor, inequalities, modular arithmetic and systems of numbers, properties of groups and fields, the field of complex numbers, polynomial arithmetic and algebra, linear equations. Course will develop the mathematical structures, algebraic properties, and applications of matrices, determinants, vectors, vector spaces, systems of linear equations, and linear transformations. Students will engage with these concepts through exploration, analysis, proof, and problem solving based on activities used in secondary and middle school mathematics. Throughout the course students will be given opportunities to relate the mathematical concepts studied to the mathematical concepts they will be teaching. Students enrolled in this course at the 700 level will meet additional academic requirements including an applied project.
Prerequisite(s): (MTH 802 with a minimum grade of B- or MATH 700G with a minimum grade of B- and (MTH 807 with a minimum grade of B- or MATH 707G with a minimum grade of B-.
Equivalent(s): MATH 704G
Grade Mode: Letter Grading

MTH 810 - Algebra Theory for Teachers
Credits: 4
This course will examine concepts in Algebra including patterns, functions, arithmetic sequences, geometric sequences, arithmetic and algebra of the integers, least common multiple and greatest common division, inequalities, basic properties of groups and fields, and polynomial arithmetic and algebra. Throughout the course students will be given opportunities to relate the mathematical concepts studied to the mathematical concepts they will be teaching.
Prerequisite(s): (MTH 802 with a minimum grade of B- or MATH 700G with a minimum grade of B- and (MTH 805 with a minimum grade of B- or MATH 706G with a minimum grade of B-.
Equivalent(s): MATH 709G
Grade Mode: Letter Grading