MATHEMATICS (MATH)

Courses

MATH 617 NUMBER THEORY 3 Units
A study of the properties of integers, representation of integers in a given base, properties of primes, arithmetic functions, modulo arithmetic. Diophantine equations and quadratic residues. Consideration is also given to some famous problems in number theory.
PREREQ: UNDERGRADUATE DEGREE IN MATHEMATICS OR CONSENT OF INSTRUCTOR

MATH 623 ADVANCED FUNCTION AND ALGEBRA CONCEPTS 3 Units
Concepts from high school mathematics are discussed from an advanced perspective using calculus, abstract and linear algebra, and some complex variables. The topics include number systems, equations, functions, polynomials and basic number theory. Challenging problems and projects help to develop deeper understanding, and highlight connections of different areas of mathematics.
PREREQ: UNDERGRADUATE DEGREE IN MATHEMATICS OR CONSENT OF INSTRUCTOR

MATH 624 ADVANCED TOPICS IN GEOMETRY AND TRIGONOMETRY 3 Units
The course material is centered around concepts in geometry and trigonometry including geometric transformations in 2 and 3 dimensions, their representations by matrices, and equations with complex numbers. Metric spaces, minimum distance problems, quadratic, arithmetic, geometric, harmonic means. Area, volume and geometric probability. Multiple representations of the trigonometric functions and their identities. An individual research project is to be completed.
PREREQ: UNDERGRADUATE DEGREE IN MATHEMATICS OR CONSENT OF INSTRUCTOR

MATH 649 PROBABILITY AND STATISTICAL INFERENCE 3 Units
Foundations associated with quantifying and modeling chance and randomness with a focus on the role probability plays in statistical inference. Topics include set theory, combinatorics, random variables, selected discrete and continuous probability distributions, probability distributions for commonly used statistics, and the logic and applied use of probability in formulating and conducting hypothesis tests.
PREREQ: UNDERGRADUATE DEGREE IN MATHEMATICS OR STATISTICS, OR INSTRUCTOR CONSENT

MATH 650 GRAPH THEORY 3 Units
This course will examine basic concepts and applications of graph theory. Topics covered will be selected from trees, connectivity, paths and cycles, coloring, matching and covering problems, digraphs, and network flows.
PREREQ: UNDERGRADUATE DEGREE IN MATHEMATICS OR CONSENT OF INSTRUCTOR

MATH 690 WORKSHOP *Repeatable* 1-3 Units
Variable topics. Group activity oriented presentations emphasizing `hands on` and participatory instructional techniques.

MATH 694 SEMINAR *Repeatable* 2 Units
Variable topics. Group activity. An advanced course of study in a defined subject matter area emphasizing a small group in intense study with a faculty member.

MATH 696 SPECIAL STUDIES *Repeatable* 1-3 Units
Variable topics. Group activity. Not offered regularly in the curriculum but offered on topics selected on the basis of timeliness, need, and interest, and generally in the format of regularly scheduled Catalog offerings.

MATH 721 COMBINATORICS 3 Units
This course will cover topics in combinatorics and graph theory such as combinations, permutations, Pigeonhole Principle, Binomial and Multinomial Theorems, Inclusion-Exclusion Principle, Stirling numbers, partially-ordered sets, generating functions, connectedness, Cayley Theorem, graph coloring, Eulerian walks, Hamiltonian circuits, planar graphs, and Ramsey Theory. Connections will be made to undergraduate mathematics content.
PREREQ: MATH 280 OR EQUIVALENT COURSE OR CONSENT OF INSTRUCTOR

MATH 752 ABSTRACT ALGEBRA 3 Units
This course will cover fundamental algebraic structures such as rings, fields, and maps between these structures. Relations of these concepts to Algebra topics in undergraduate mathematics will be emphasized. Galois Theory will be introduced if time allows.
PREREQ: MATH 452 OR EQUIVALENT ABSTRACT ALGEBRA COURSE OR CONSENT OF INSTRUCTOR

MATH 764 TOPICS IN ANALYSIS 3 Units
A graduate course exploring select topics in real and complex analysis with emphasis on computation, abstract argumentation, and connection to the theoretical basis for calculus and related courses. Topics include the topology of n-dimensional real space, integration in multiple dimensions, infinite series, calculus of a complex variable, and the Cantor set.
PREREQ: MATH 255 OR EQUIVALENT MULTIVARIATE CALCULUS COURSE OR CONSENT OF INSTRUCTOR

MATH 790 WORKSHOP 1-6 Units
Variable topics. Group activity oriented presentations emphasizing `hands on` and participatory instructional techniques.

MATH 794 SEMINAR 1-3 Units
Variable topics. Group activity. An advanced course of study in a defined subject matter area emphasizing a small group in intense study with a faculty member.

MATH 796 SPECIAL STUDIES *Repeatable* 1-3 Units
Variable topics. Group activity. Not offered regularly in the curriculum but offered on topics selected on the basis of timeliness, need, and interest, and generally in the format of regularly scheduled Catalog offerings.

MATH 798 INDIVIDUAL STUDIES *Repeatable* 1-3 Units
In addition to allowing students to carry on independent studies in a wide variety of graduate level topics, students may take many of the department¿s upper level undergraduate courses supplemented with graduate components. These courses include advanced calculus, complex variables, differential equations, abstract algebra, number theory, probability, statistics, and more.

MATH 799 THESIS RESEARCH *Repeatable* 1-6 Units
Students must complete a Thesis Proposal Form in the Graduate Studies Office before registering for this course.