

# Graduate Mathematics Course Listing

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## MATH 570. Advanced Instructional Strategies in Mathematics (3-3-0)

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

*Fall.*

An update on the methodological background necessary for teaching school mathematics based on current understanding and insights derived from both content and pedagogy. Development of creative instructional approaches that are meaningful and mathematically correct and which instill enthusiasm and satisfaction in learning and using mathematics. Includes practice in classroom environment.

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## MATH 572. Current Issues in School Mathematics (3-3-0)

In-depth exploration of current issues in mathematics education. Topics may include: the "problem solving" centered mathematics curriculum; participation and retention of females and minorities in mathematics; mathematics anxiety; using technology in teaching mathematics; the NCTM Curriculum and Evaluation Standards for School Mathematics.

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## MATH 573. History of Mathematics (3-3-0)

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

*Spring.*

A study of the origins, philosophy and development of mathematics from classical antiquity

through the 20th century. It focuses on critical periods in the evolution of areas such as geometry, number theory, algebra and calculus. Involves problem solving and reading.

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## **MATH 574. Discrete Mathematics (3-3-0)**

A course designed to expose students to the discrete aspects of mathematics. Course emphasizes: developing basic techniques and modes of reasoning in combinatorial problem solving; describing and analyzing the algebraic structure of certain sets; relation systems; and illustrating and analyzing the wide variety of applications of discrete mathematics. Topics include logic, sets, algorithms, mathematical induction, combinatorics, number theory, graph theory and Boolean algebra.

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## **MATH 575. Computers & Calculators in School Mathematics (3-3-0)**

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

*Summer.*

A course designed to explore the use of computers and graphing calculators as tools in the teaching/learning of mathematics. An integral part of the course is the hands-on use of selected software for introducing, developing and reinforcing mathematical concepts.

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## **MATH 576. Mathematical Connections (3-3-0)**

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

*Fall.*

The study of various topics from algebra, functions, number theory, geometry, probability, and statistics. The course emphasizes the connections and interplay among these topics and their applications so that the student can use and value the connections among mathematical topics and use and value the connections between mathematics and other disciplines.

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## **MATH 578. Elementary Geometry from an Advanced**

## Viewpoint (3-3-0)

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

*Spring.*

Compares and contrasts the origins, applications and basic structures of Euclidean and non-Euclidean geometry. Attention is given to ideas involved in teaching geometry.

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## MATH 579. Modern Analysis (3-3-0)

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

*Fall.*

A study of the theoretical development of the calculus concepts. Topics include structure and properties of real number systems, functions, sequences and series, antiderivatives, and Lebesgue integrals.

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## MATH 580. Advanced Numerical Analysis (3-3-0)

The course covers a range of topics in numerical analysis, concentrating on an introduction to finite elements and their applications. Use of a software package and research journal readings are required.

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## MATH 581. Graduate Abstract Algebra (3-3-0)

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

A review of topics in logic, set theory, and number theory; followed by a systematic study of rings, fields, and vector spaces; field extensions; polynomials and constructibility.

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## MATH 582. Introduction to Topology (3-3-0)

An introductory course in topology. Topics include sets and functions, topology spaces, metrics spaces, connectedness, compactness, countability and separation.

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## **MATH 583. Mathematics in the Content Areas (3-3-0)**

This course assists teachers in developing creative instructional approaches which integrate mathematics with other content areas (science, social studies, language arts, fine arts, physical education) and which instill in students enthusiasm and satisfaction in learning and using mathematics. The course provides opportunities to implement these methodological practices in the classroom.

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## **MATH 584. Mathematics Cognition (3-3-0)**

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

*Summer.*

This course examines mathematics learning theories developed during the 20th-century with an emphasis on recent research on learning mathematics. The learning theories are related to each other, to mathematics teaching and instruction, and to curricular decision making. Students are expected to implement instructional or curricular changes in their classroom in a unit and then evaluate the implementation.

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## **MATH 585. Advanced Studies of Elementary School Mathematics Topics (3-3-0)**

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

*Spring.*

This course covers topics from mathematics courses not required for licensure but now part of the elementary mathematics curriculum. The topics include statistics, probability, geometry, patterns and functions. The course will provide an in-depth study of concepts within the topics and effective methods for teaching the concepts to elementary students.

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## MATH 591. Directed Research and Internship for Educators (3-3-0)

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

Research in applied mathematics at a national laboratory and introduction to innovative methods for teaching mathematics and science. Participants are exposed to instruction by educators and laboratory staff in theoretical and experimental foundations in problem solving. They also receive hands-on telecommunications experiences, research experiences, special presentations and tours. Post-institute follow-up activities are programmed to ensure implementation of institute strategies and to provide modeling standards among teachers for successful transfer to school systems.

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## MATH 595. Advanced Topics in Mathematics (credit varies)

*Prerequisite: Enrollment in the MAT program or consent of instructor.*

Course topics are selected on the basis of faculty and student interests.

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