MATH, GRADUATE (MG)

MG 5010 Seminar in Mathematics Education (1-4 Credits)
The topic for the course is selected by the professor from current developments and issues in mathematics education, such as Mathematics for Exceptional Children, Piaget's Research, Mathematics Assessment, and Algebra in the K-12 Curriculum. Course may be repeated on a different topic with permission of the department chair.

MG 5220 Numbers and Operations for Elementary/Middle School Teachers (4 Credits)
This course focuses on advanced concepts and procedures in numbers and operations (gr. K - 8). Mathematical topics include pre-number and early number concepts, place value and number systems, arithmetic operations including calculational fluency with traditional algorithms and mental math, proportional reasoning, and the historical development of number and number systems. Classroom activities demonstrate how mathematical problem solving, reasoning, and communication can be integrated in the everyday learning experiences of every student. Building on this knowledge students design lesson plans to achieve clear content and process objectives. Classroom discussions focus on thinking processes, mathematical concepts, habits of mind, conceptual understanding, and dispositions that students need in order to develop a deep, flexible, and enduring understanding of mathematics.

MG 5230 Algebra and Functions for Elementary/Middle School Teachers (4 Credits)
This course focuses on advanced concepts and procedures in algebra and functions (gr. K - 8). Mathematical topics include generalizing patterns, different use of variables, equations and inequalities, functions in multiple representations, modeling with functions, and historical development of algebra and functions. Classroom activities demonstrate how mathematical problem solving, reasoning, and communication can be integrated in the everyday learning experiences of every student. Building on this knowledge students design lesson plans to achieve clear content and process objectives. Classroom discussions focus on thinking processes, mathematical concepts, habits of mind, conceptual understanding, and dispositions that students need in order to develop a deep, flexible, and enduring understanding of mathematics.

MG 5240 Geometry and Measurement for Elementary/Middle School Teachers (4 Credits)
This course focuses on advanced concepts and procedures in geometry and measurement (gr. K - 8). Mathematical topics include features and classifications of 2-d and 3-d shapes, area, volume, surface area, congruence, similarity, proofs of selected theorems, and the historical development of geometry. Classroom activities demonstrate how mathematical problem solving, reasoning, and communication can be integrated in the everyday learning experiences of every student. Building on this knowledge students design lesson plans to achieve clear content and process objectives. Classroom discussions focus on thinking processes, mathematical concepts, habits of mind, conceptual understanding, and dispositions that students need in order to develop a deep, flexible, and enduring understanding of mathematics.

MG 5250 Data Analysis and Probability for Elementary/Middle School Teachers (4 Credits)
This course focuses on advanced concepts and procedures in data analysis and probability (gr. K - 8). Mathematical topics include data representation and interpretation, data analysis, classical definition of probability, odds, expected value, and historical development of statistical and probabilistic ideas. Classroom activities demonstrate how mathematical problem solving, reasoning, and communication can be integrated in the everyday learning experiences of every student. Building on this knowledge students design lesson plans to achieve clear content and process objectives. Classroom discussions focus on thinking processes, mathematical concepts, habits of mind, conceptual understanding, and dispositions that students need in order to develop a deep, flexible, and enduring understanding of mathematics.

MG 5320 Number, Quantity, and Algebra for Middle/Secondary School Teachers (4 Credits)
This course focuses on algebraic thinking and concepts central to the Common Core State Standards in Mathematics [CCSSM]. Specifically, the mathematical content of the course aligns with the CCSSM standards (gr. 5-12) in number, quantity, and algebra. Classroom activities explore this mathematical content and the Standards for Mathematical Practice in CCSSM deepening students' understanding. The activities also demonstrate how mathematical practices can be integrated in the everyday learning experiences of every student. Building on this knowledge students design lesion plans to achieve clear content and process objectives. Classroom discussions focus on thinking processes, mathematical concepts, habits of mind, conceptual understanding, and dispositions that students need in order to develop a deep, flexible, and enduring understanding of mathematics.

MG 5330 Functions and Modeling for Middle/Secondary School Teachers (4 Credits)
This course focuses on functions and modeling concepts central to the Common Core State Standards in Mathematics [CCSSM]. Specifically, the mathematical content of the course aligns with the CCSSM standards (gr. 5-12) in functions and modeling. Students will develop conceptual understanding and confidence working with functions and modeling. Activities are designed to demonstrate how the Standards for Mathematical Practice in CCSSM can be integrated in the everyday learning experiences of every student. Class discussions are centered on thinking processes, habits of mind, conceptual understanding, and dispositions that students need in order to develop a deep, flexible, and enduring understanding of mathematics.

MG 5340 Geometry for Middle/Secondary School Teachers (4 Credits)
This course focuses on Euclidean geometry concepts central to the Common Core State Standards in Mathematics [CCSSM]. The mathematical content of the course aligns with the CCSSM standards (gr. 5-12) in geometry. Students will develop conceptual understanding of geometric properties and relationships, applying and analyzing concepts, procedures, and proofs. Activities are designed to demonstrate how the Standards for Mathematical Practice in CCSSM can be integrated in the everyday learning experiences of every student. Class discussions are centered on thinking processes, habits of mind, conceptual understanding, and dispositions that students need in order to develop a deep, flexible, and enduring understanding of mathematics.

MG 5350 Statistics and Probability for Middle/Secondary School Teachers (4 Credits)
This course focuses on statistics and probability concepts central to the Common Core State Standards in Mathematics [CCSSM]. The mathematical content of the course aligns with the CCSSM standards (gr. 5-12) in statistics and probability. Students will develop conceptual understanding and fluency in statistical concepts, data analysis, and probability. Activities are designed to demonstrate how the Standards for Mathematical Practice in CCSSM can be integrated in the everyday learning experiences of every student. Class discussions are centered on thinking processes, habits of mind, conceptual understanding, and dispositions that students need in order to develop a deep, flexible, and enduring understanding of mathematics.

MG 5760 Topics in Mathematics for Elementary/Middle School Teachers (1-4 Credits)
Topics for this course can vary, but may focus on one or more of the following ideas: problem solving, logic and proof, set theory and Venn diagrams, calculus notions, number systems, and mathematical modeling. A standard text on the topic will be used when appropriate. Students may repeat the course with a different topic as its focus with the permission of the department chair.

MG 5820 Topics in Number Theory for Middle/Secondary School Teachers (2-4 Credits)
Topics in this course vary, but may focus on one or more of the following topics, which are traditionally found in the middle/secondary mathematics curriculum, such as prime numbers, mathematical induction, the Euclidean algorithm, divisibility and complex numbers. Other topics explored may include Peano's Postulates, Fermat's Last Theorem and the Well-Ordering Principle. A standard text on the topic will be used when appropriate. Students may repeat the course with a different topic as its focus with the permission of the department chair.

MG 5830 Topics in Discrete Mathematics for Middle/Secondary School Teachers (2-4 Credits)
Topics in this course vary, but may focus on one or more of the following: logic, proof, set theory and Venn diagrams, algorithmic thinking, Boolean Algebra, mathematical induction, recursion relations, graph theory and networking, and relating those ideas to teaching discrete mathematics in grades 7-12. Students may repeat the course with a different topic as its focus with the permission of the department chair.

MG 5840 Topics in Geometry for Middle/Secondary School Teachers (2-4 Credits)
Topics for this course can vary, but may focus on one or more of the following: history of Euclidean and non- Euclidean geometry, Euclidean geometries, non-Euclidean geometries, Euclidean geometries in the plane, polyhedra, analytic and transformational geometry, projective geometry, fractals, geometry in the real world, and topology. Investigations may use computer software and Internet resources. Students may repeat the course with a different topic as its focus with permission of the department chair.

MG 5850 Topics in Statistics/Probability for Middle/Secondary School Teachers (2-4 Credits)
Topics for this course can vary, but may focus on one or more of the following: techniques and content for teaching statistics and probability at the secondary level; organizing and displaying univariate data, stem and leaf; box and scatter plots; regression analysis, linear programming, random sampling; confidence intervals and tests of significance; experimental design; discrete and continuous probability functions; and experimental and theoretical probability. Students may explore these ideas through hands-on activities, computer software, or graphing calculators. Students may repeat the course with a different topic as its focus with the permission of the department chair.

MG 5860 Topics in Mathematics for Middle/Secondary School Teachers (1-4 Credits)
Topics for this course can vary, but may focus on one or more of the following ideas: problem solving, logic and proof, set theory and Venn diagrams, topology, real analysis, complex analysis and mathematical modeling. Standard text on the topic will be used when appropriate. Students may repeat the course with a different topic as its focus with the permission of the department chair.

MG 5910 Independent Study (1-4 Credits)
An individual study project determined to be of value to students and the Mathematics Department. Students present a talk concerning some portion of their study to a department colloquium during the term. Consent of a faculty supervisor and department chair is required.

MG 5960 Mathematics Teaching Internship (1-9 Credits)
This course is the culminating field-based teaching experience for teacher certification students in the Master of Education (MEd) in mathematics or Post Baccalaureate, Middle or Secondary Education programs. Students must have completed early field-based experiences and all coursework for the certification, including any required undergraduate competencies, before taking this course. Teacher candidates pursuing an internship will gradually assume responsibility for a full range of teaching activities encountered in a school situation. Internship provides an opportunity for demonstrating the appropriate professional skills, attitudes and dispositions essential for successful teaching. The teaching field experience is conducted under the supervisory guidance of mentor teacher and university supervisor. An online seminar compliments the experience. Certification candidates who are not pursuing the M.Ed. must have submitted passing scores on the Core Academic Skills for Educators before enrolling. All candidates who will be required to take Praxis II for NH Certification must make arrangements for that testing independently.
Prerequisite(s): Completion of all other program requirements for certification by the beginning of the internship semester; permission of the Coordinator of Teacher Certification and Clinical Experiences; and Mathematics Department Program Coordinator.