# Mathematics/Middle Grades (MTHM)

**MTHM 100 - Algebra Workshop**  
1 Credit  
This course is offered to strengthen the students' mathematical foundation and facility in algebraic processes. It is a prerequisite or corequisite for MATH 100 for students that have not successfully completed the basic skills math requirement. It is also open to students that have completed the requirement (but need extra practice) that are taking or planning to enroll in MATH 100. The course will provide just-in-time remediation to students and the curriculum will be aligned with that of MATH 100. Topics covered each week will directly relate to foundational material that will be covered in MATH 100. Students may not withdraw from this course without advisor approval. Withdrawal from this course requires withdrawal from MATH 100 as well. May be repeated for a maximum of 2 credits.

**MTHM 101 - Foundations of Pre-Service Mathematics**  
1 Credit  
Prerequisite(s): By permit only; Failing score on Praxis 1 Core Math exam or those that plan to take the Praxis 1 Core Math exam. This course will focus on the foundations of mathematics necessary for pre-service teachers to have a mastery of mathematics in preparation for careers in teaching. Students study an overview of four major content areas in mathematics: numbers and quantity, algebra and functions, geometry, statistics and probability. For students applying to majors in the School of Education. 1 hour lecture.

**MTHM 201 - Mathematics in Elementary Schools I**  
3 Credits  
Prerequisite(s): ECEL 200. This course is intended for undergraduate students seeking certification to teach early childhood and elementary school (P-3, K-6). The course will provide prospective early childhood and elementary school teachers with opportunities to develop deep, connected understandings of (1) content included in the Operations & Algebraic Thinking and Number & Operations strands of the Common Core State Standards for Mathematics (CCSSM), as well as (2) factors that influence student learning of that content, (3) characteristics of instruction that are effective in promoting development of student understanding of the concepts from operations and algebraic thinking and number and operations included in the Pre-K through grade 6 mathematics curriculum, and (4) research on student learning of Pre-K through grade 6 operations and algebraic thinking and number and operations. Meets Gen Ed - Mathematics. 3 hours lecture.

**MTHM 302 - Mathematics in Elementary Schools II**  
3 Credits  
Prerequisite(s): ECEL 200 and MTHM 201. The course is intended for undergraduate students seeking certification to teach early childhood and elementary school (P-3, K-6). The course will provide prospective early childhood and elementary school teachers with opportunities to develop deep, connected understandings of (1) content included in the Geometry, Measurement & Data, and Fraction Operations strands of the Common Core State Standards for Mathematics (CCSSM), as well as (2) factors that influence Pre-K through grade 6 student learning of that content, (3) characteristics of classroom instruction that are effective in promoting development of student understanding of elementary geometry, measurement and data, and fraction operations, and (4) research on student learning of elementary school geometry, measurement and data, and fraction operations. Previous course MTHM 202 effective through Spring 2011. 3 hours lecture.

**MTHM 405 - Numbers and Operations in the Middle Grades**  
3 Credits  
Prerequisite(s): Permission of the graduate coordinator. Topics are organized around the fundamental concepts of number and operations. This course prepares middle-grade teachers to help their students understand numbers, ways of representing numbers, relationships among numbers, number systems, operations on numbers, how to compute fluently, and how to make reasonable estimates. 3 hours lecture.

**MTHM 406 - Algebra and Algebraic Thinking in the Middle Grades**  
3 Credits  
Prerequisite(s): Permission of the graduate coordinator. Topics from pre-algebra and algebra are studied to prepare middle grade mathematics teachers to enable all students to: understand patterns, relationships and functions; represent and analyze mathematical situations and structures using algebraic symbols; use mathematical models to represent and understand quantitative relationships; and analyze change in various contexts. Topics initially approach algebra from a numerical perspective. Strategies for gradually increasing the use of variables and abstract thinking with middle grade students are discussed. 3 hours lecture.

**MTHM 407 - Geometry and Geometric Thinking in the Middle Grades**  
3 Credits  
Prerequisite(s): Permission of the graduate coordinator. Topics are organized around the fundamental concepts of geometry, the use of geometric thinking as a problem solving tool, and the methods and techniques needed to help students understand and apply these concepts and skills in the middle grades. Teachers gain the knowledge needed to enable their students to develop spatial sense and an ability to use geometric properties and relationships to solve problems in mathematics and in everyday life. Specific emphasis is placed on recognizing, visualizing, representing, and transforming geometric shapes in two and three dimensions. 3 hours lecture.

**MTHM 408 - Data Analysis and Probability in the Middle Grades**  
3 Credits  
Prerequisite(s): Permission of the graduate coordinator. Topics include the basics of collection, summarization, and interpretation of data, and the fundamental ideas of probability. Sampling techniques, experimental design, graphical and numerical summarization of data and the basic ideas of drawing conclusions from data are discussed. Methods for teaching these concepts in the middle grades are discussed in tandem as the material is presented. 3 hours lecture.

**MTHM 409 - Measurement in the Middle Grades**  
3 Credits  
Prerequisite(s): Permission of the graduate coordinator. Topics are organized around the fundamental and unifying topic of measurement. What attributes of an object are measurable? How are those attributes measured? What system of measurement should be used? What are the units and how are the results converted to other systems? Measurement is a topic that is found across the school curriculum, not just in the mathematics curriculum, and thus it is a topic that can be used to develop cross subject discussions and investigations. Methods for teaching measurement in the middle grades are discussed in tandem with the content being studied. 3 hours lecture.

**MTHM 505 - Number and Operations in the Middle Grades**  
3 Credits  
Prerequisite(s): Acceptance in the certificate or Master's program in Teaching Middle Grades Mathematics and permission of the graduate program coordinator. Topics are organized around the fundamental concepts of number and operations with them. This course prepares middle-grade teachers to help their students understand numbers, ways of representing numbers, relationships among numbers, number systems, operations on numbers, how to compute fluently and how to make reasonable estimates. 3 hours lecture.
MTHM 506 - Algebra and Algebraic Thinking in the Middle Grades  
3 Credits
Prerequisite(s): MTHM 505 and permission of graduate program coordinator. Topics from pre-algebra and algebra are studied to prepare middle-grades mathematics teachers to enable all students to understand patterns, relationships and functions; represent and analyze mathematical situations and structures using algebraic symbols; use mathematical models to represent and understand quantitative relationships; and analyze change in various contexts. Topics initially approach algebra from a numerical perspective. Strategies for gradually increasing the use of variables and abstract thinking with middle-grade students are discussed. 3 hours lecture.

MTHM 507 - Geometry for Middle-Grade Math Teachers  
3 Credits
Prerequisite(s): MTHM 505 and permission of graduate program coordinator. Topics are organized around the fundamental concepts of geometry, the use of geometric thinking as a problem-solving tool, and the methods and techniques needed to help students understand and apply these concepts and skills in the middle grades. Teachers gain the knowledge needed to enable their students to develop spatial sense and an ability to use geometric properties and relationships to solve problems in mathematics and in everyday life. Specific emphasis is placed on recognizing, visualizing, representing, and transforming geometric shapes in two and three dimensions. 3 hours lecture.

MTHM 508 - Data Analysis and Probability in the Middle Grades  
3 Credits
Prerequisite(s): MTHM 505 and permission of graduate program coordinator. Topics include the basics of collection, summarization, and interpretation of data, and the fundamental ideas of probability. Sampling techniques, experimental design, graphical and numerical summarization of data and the basic ideas of drawing conclusions from data are discussed. Methods for teaching these concepts in the middle grades are discussed in tandem as the material is presented. 3 hours lecture.

MTHM 509 - Measurement in the Middle Grades  
3 Credits
Prerequisite(s): MTHM 507 and permission of graduate program coordinator. Topics are organized around the fundamental and unifying topic of measurement. What attributes of an object are measurable? How are those attributes measured? What system of measurement should be used? What are the units and how are the results converted to other systems? Measurement is a topic that is found across the school curriculum, not just in the mathematics curriculum, and thus it is a topic that can be used to develop cross-subject discussions and investigations. Methods for teaching measurement in the middle grades are discussed in tandem with the content being studied. 3 hours lecture.

MTHM 511 - Workshop in Mathematics Education  
3 Credits
Prerequisite(s): MTHM 505 and permission of Graduate Program Coordinator. Specific contemporary topics and current issues in school mathematics. May be repeated for a maximum of 6 credits as long as the topic is different. 3 hours lecture.