

MATHEMATICS/MIDDLE GRADES (MTHM)

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. Satisfies Mathematics GenEd requirement; satisfies SEEDS Quantitative Reasoning student learning outcome in alignment with Engagement, Agency and Leadership value.

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.

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.

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.

MTHM 407 Geometry and Geometric Thinking in the Middle Grades (3 credits)

Prerequisite(s): MTHM 302 may be taken as prerequisite or corequisite. 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.

MTHM 408 Data Analysis and Probability in the Middle Grades (3 credits)

Prerequisite(s): MTHM 302 may be taken as prerequisite or corequisite. 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.

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.

MTHM 505 Number and Operations in the Middle Grades (3 credits)

Restriction(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.

MTHM 506 Algebra and Algebraic Thinking in the Middle Grades (3 credits)

Prerequisite(s): 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.

MTHM 507 Geometry for Middle-Grade Math Teachers (3 credits)

Prerequisite(s): 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.

MTHM 508 Data Analysis and Probability in the Middle Grades (3 credits)

Prerequisite(s): 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.

MTHM 509 Measurement in the Middle Grades (3 credits)

Prerequisite(s): 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.

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.

MTHM 577 Mathematics Education in the Elementary School (3 credits)

Restriction(s): Acceptance in the Teaching, with Teacher Certification in Elementary School Teacher in Grades K#6 (MAT) program or with permission of the graduate program coordinator. This course is intended to strengthen pre-service and in-service elementary school teachers' mathematics content knowledge for teaching and to enable them to explore what it means to learn and teach mathematics with understanding and to develop their mathematical reasoning with numbers and quantities. We will pay particular attention to how children think about mathematics and learn to use what we know about children's thinking to design and adapt instructional activities. Throughout the course, the students will examine evidence of children's reasoning, learning to understand how children generate mathematical ideas.

MTHM 579 Applied Mathematics for the Middle Schools (3 credits)

Restriction(s): Acceptance in the masters' program in Teaching Middle Grades Mathematics and permission of the graduate program coordinator. Topics in middle grade mathematics are explored with an emphasis on their application to both traditional and more recently developed areas. Applied problems are used to motivate mathematical topics, and mathematical knowledge is used to explore solutions to applied problems.