

Course Goals: Math 459, Methods of Teaching Middle/Secondary School Mathematics



Course Description:

Designed to provide an integrative study of curriculum and instruction in mathematics for middle/secondary level classrooms including appropriate research and practice in learning theories, curriculum development, teaching methods, instructional materials, evaluation and assessment at the middle/secondary level. Emphasis is on the NCTM Principles and Standards for School Mathematics and the Wisconsin Model Academic Standards for Mathematics. (Prerequisite: MATH 451, junior standing, and admission to Teacher Education Program or consent of Departments of Education and Mathematics) Crosslisted with ED 459M (S)

Knowledge:

Students will be able to provide evidence of knowledge of

- all six NCTM Principles and all ten Standards, as well as the Wisconsin Model Academic Standards for Mathematics
- the literature related to teaching and learning within each of the content strands of middle/secondary mathematics.
- various models of mathematical understanding and their relationship to teaching and learning middle and secondary school mathematics
- application of learning theories to mathematics teaching
- the roles of teacher and student in various models of teaching and learning in mathematics.
- a variety of representations of mathematical ideas
- the history and basis of the current mathematics reform movement, along with recent findings regarding its effects
- the major reform curriculum programs as well as traditional approaches to mathematics instruction at the middle and secondary level
- methods by which districts or teachers choose texts
- resources available for supplementing curriculum programs, including information about research base

Skills:

Students will demonstrate the ability to

- evaluate observed mathematics teaching in light of the NCTM's PSSM and other best practice models.
- identify common mathematical errors/misconceptions and how to prevent/remedy them
- analyze the mathematics involved in a given problem and identify possible steps to take with students as well as predicting possible student responses
- develop/evaluate and discuss appropriate uses of games that teach mathematical content while providing motivation and chance for inclusion
- formulate and defend a position about the use of calculators and computers in the classroom, demonstrating knowledge of proper and improper use
- evaluate and discuss uses of manipulatives with various concepts and student knowledge bases
- design questions appropriate for various situations (assessment, promoting classroom discourse), using the language of Bloom
- plan lessons using various methods of instruction in light of student learning needs and content
- describe/demonstrate methods for teaching many common mathematical topics, incorporating ideas in other goals (manipulatives, technology, questioning, multiple strategies, various learning theories)
- design tasks to assess understanding of specific mathematical concepts
- create and use rubrics to evaluate student work
- discuss student preparation for and critique of standardized exams

- describe various types of portfolios and demonstrate skills necessary to use them effectively to assess mathematics learning
- discuss the appropriate uses of various types of assessment
- discuss and evaluate methods for accommodating students with special needs, different learning styles & intelligences or for multiple knowledge levels in a class
- form connections with (future) teaching colleagues throughout the state for the purpose of adding to content or pedagogical knowledge

Dispositions:

Students will display positive orientations towards the beliefs that

- every student can learn mathematics; it is important to have clear goals and high expectations for all students
- representing mathematics concepts appropriately is a large part of mathematics teaching
- students can construct their own knowledge about mathematics, and always have previous mathematical knowledge
- it is necessary to develop a positive disposition toward mathematics in themselves and their students
- there is more than one valid way to approach most mathematics problems
- mathematics is logical—it can and should be explained rather than memorized
- research is an important component of mathematics education at every level

Approved January 2006