MA 425 Methods & Materials for Teaching Secondary Mathematics

Course Description: (3 semester hours) Practical aspects of teaching and learning mathematics at the secondary level. Topics covered include secondary mathematics curricula, preparation and presentation of lesson material, classroom management, and professional behaviors. This class includes five 3 hour blocks of classroom observation visits. Open only to education majors with a teaching field in mathematics.

Prerequisite: Credit or concurrent enrollment in MA 421

Course Objectives:

1. *Knowledge of secondary curricula:* Student will examine the secondary courses (algebra, geometry, general mathematics, pre-calculus, and calculus) and the methods that should be utilized to teach them.
2. *Practice in developing lesson plans and teaching them.* Students will develop lesson plans and deliver some of those lessons. Students will be videotaped as they practice teach and will critique their own and their classmates' performance. Various strategies for problem solving will be explored as well as estimation strategies for determining the reasonableness of answers.
3. *Demonstrate knowledge of the intellectual, historical, and philosophical development of mathematics and how humans learn mathematics:* Students will understand the development of mathematics and become aware of multicultural contributions to mathematics. Students will be exposed to the current literature that is concerned with how humans learn mathematics.
4. *Practice preparing lessons that will include technology:* Students will have hands-on experience in preparing and delivering lessons that include the use of calculators, graphing calculators, computer, etc.
5. *Classroom management:* Students will explore ideas concerning how to maintain control and how to maintain a positive attitude towards one's students.
6. *What mathematics reform has accomplished in K-6 and knowledge of alternative computational algorithms:* Students will learn about the curriculum and methods in use at the elementary school level so that they will appreciate the academic background of their secondary students.
7. *Professional behaviors:* Students will become aware of mathematics professional organizations. They should develop an appreciation for the need for professional development and become aware of resources that are available to enhance their personal knowledge of mathematics.
8. *Knowledge of co-curricular activities:* Student will become aware of the importance of mathematics tournaments and clubs.
9. *Math Manipulatives:* Students will study math manipulatives and their use in effectively teaching mathematics.
10. *Inquiry:* Students will learn about inquiry and its use in effectively teaching mathematics. Students will also demonstrate the ability to conduct and lead students in inquiry math activities.
11. *Problem Solving:* Students will demonstrate knowledge of various problem-solving strategies, including reading the problem, interpreting the problem, writing/ using appropriate mathematical models, solving the problem, and reflecting on the reasonableness of the answer; working problems backwards; and estimating, making predictions, and checking.

12. *Mathematics as a Language:* Students will demonstrate knowledge of mathematics vocabulary and symbols and mathematics as the basic language of science and the relationship of mathematics to emerging technologies.
13. *Communication:* Students will demonstrate the ability to use language and symbols of mathematics accurately in communications.
14. *Problem Solving:* Students will demonstrate the ability to integrate problem-solving strategies learned in mathematics into the solution of problems encountered in daily living.
15. *Content Standards:* Knowledge of the content standards and the slope and sequences of the mathematics area as defined in the Alabama course of study.

Course Content:

1. The Secondary Mathematics Curriculum and Teaching
2. Development of Mathematics and Recent Research Concerning How Humans Learn Mathematics
3. Student Conceptions
4. Teaching with Technology
5. Classroom Management and Professional Behaviors

Course Evaluation:

1. Tests
2. Reading summaries
3. Student Teaching a Lesson
4. Research Paper
5. Project

Course Requirements:

Calculator Policy: Please refer to your instructor's course syllabus to find their course-specific calculator policy.

Grading Policy: Grades will be assigned according to the following scale: 90 - 100 = A; 80 - 89 = B; 70 -79 = C; 60 - 69 = D; 0 - 59 = F

Accommodation Statement

In accordance with the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973, the University offers reasonable accommodations to students with eligible documented learning, physical and/or psychological disabilities. Under Title II of the Americans with Disabilities Act (ADA) of 1990 and Section 504 of the Rehabilitation Act of 1973, a disability is defined as a physical or mental impairment that substantially limits one or more major life activities as compared to an average person in the population. It is the responsibility of the student to contact Developmental Services prior to the beginning of the semester to initiate the accommodation process and to notify instructors within the first three class meetings to develop an accommodation plan. Appropriate, reasonable accommodations will be made to allow each student to meet course requirements, but no fundamental or substantial alteration of academic standards will be made. Students needing assistance should contact Developmental Services.