

**University of Arkansas – Fort Smith
5210 Grand Avenue
P.O. Box 3649
Fort Smith, AR 72913
479-788-7000**

General Syllabus

MATH 3823 Mathematics Pedagogy for Upper Secondary Mathematics

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 1

Prerequisite: MATH 2854 Calculus II

Effective Catalog: 2018~2019

I. Course Information

A. Catalog Description

Designed for pre-service or in-service secondary mathematics teachers. Covers selected mathematics topics, technological resources, and methods of teaching relevant to the secondary mathematics curriculum with an emphasis on engaging students in concepts ranging from advanced algebra to calculus. Candidates will engage in mathematics education research and study literacy-related strategies as it relates to the mathematical content. Requires classroom tutoring of secondary school students in a local area public school for a minimum of fifteen hours.

B. Additional Description - None

II. Student Learning Outcomes

A. Subject Matter

Upon completion of the course the candidate will be able to:

1. Recognize and describe the connection of lower-level mathematics content to upper secondary mathematics content.
2. Apply, explain, and analyze the various algorithmic ways problems may be solved by students. These problems will involve making connections to other disciplines as well as connections among mathematical ideas.
3. Solve non-routine mathematics problems ranging from advanced algebra to calculus.
4. Design engaging mathematical tasks for the student's conceptual development of concepts in the following subject domains: Algebra II; Algebra III; Trigonometry; Calculus.

B. University Learning Outcomes

This course enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills: Students will analyze strategies used to compute with rational numbers. Students will use numbers, read and analyze data, create models, draw inferences, and support conclusions based on sound mathematical reasoning.

Communication Skills (written and oral)

Students will communicate proficiently. Students will participate in small group discussions and individual presentations of problem-solving strategies as well as written reflections of various techniques for calculations.

Ethical Decision Making

Students will model ethical decision-making processes while working in groups and during assessments. Students will practice the expectations concerning plagiarism by completing their own work.

Global and Cultural Perspective

Students will reflect upon cultural differences and their implications for interacting with people from cultures other than their own.

III. Major Course Topics

The following topics will be covered as they relate to the early upper high school curriculum and the developmental needs of students in this age group:

- A. Secondary Pedagogy
 - 1. Standards for Mathematical Practice
 - 2. The learning of mathematics
 - 3. The teaching of mathematics
 - 4. The language of mathematics
 - 5. Planning a mathematics unit
 - 6. Planning a mathematics lesson
 - 7. Enacting a mathematics lesson
 - 8. Reflecting on the mathematics lesson
 - 9. Creating a mathematics learning community
- B. Arkansas Standards/NCTM standards
- C. Current trends/topics in mathematics education
- D. Professional resources and organizations
 - 1. NCTM or other mathematics teaching journals and resources
 - 2. Professional development (attending conference)
- E. Technology and manipulatives
 - 1. Graphing calculators
 - 2. Online resources such as Edulastic and DESMOS
- F. Algebra, Trigonometry, and Calculus mathematics content
 - 1. Parent functions

2. Transformations