University of Arkansas - Fort Smith
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General Syllabus

MATH 3803 Foundations of Algebra

Credit Hours: 3   Lecture Hours: 3   Laboratory Hours: 1

Prerequisite: MATH 2333 Structures of Arithmetic or MATH 2443 Discrete Mathematics I

Effective Catalog: 2020~2021

I.   **Course Information**

   A. **Catalog Description**
   Introduces fundamental concepts that underlie all branches of mathematics with an emphasis on content that builds algebraic reasoning. Students will use technological resources and current research to develop a deeper understanding of concepts ranging from middle level to Algebra I. Requires clinical experience in a local school.

II.   **Student Learning Outcomes**

   A. **Subject Matter**
   Upon successful completion of this course, the student will be able to:

   1. Apply, explain, and analyze the various algorithmic ways to solve numerical problems.
   2. Solve non-routine mathematics problems ranging from middle level to Algebra 1.
   3. Design engaging mathematical tasks for the student's conceptual development of concepts ranging from middle level to Algebra 1.
   4. Use calculators and other technologies to solve numerical problems.
   5. Use internet resources to find information on strategies for solving problems.

   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. Student 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**

A. Secondary Pedagogy
   1. Standards for Mathematical Practice
   2. The learning of mathematics
   3. The teaching of mathematics
   4. Cooperative learning
   5. Planning a mathematics unit
   6. Planning a mathematics lesson
   7. Enacting a mathematics lesson
   8. Reflecting on the mathematics lesson
B. Expressions and equations
   1. Key words and phrases
   2. Arkansas Content Standards
   3. Describe mathematical relationships as expressions, verbal form, table of values, and area models
C. Ratios and Proportions
   1. Key words and phrases
   2. Arkansas Content Standards
D. Functions
   1. Key words and phrases
   2. Arkansas Content Standards
   3. Describe function relationships as equations, table of values, graphs, concrete models, and verbal form
E. Linear relationships
   1. Key words and phrases
   2. Arkansas Content Standards
   3. Describe a linear relationship by is slope, intercepts, graph, and table of values

F. Exponents
   1. Key words and phrases
   2. Arkansas Content Standards
G. Algebraic reasoning
H. Technology
   1. Graphing calculators
   2. Virtual graphing calculators (such as DESMOS)
I. Manipulatives
   1. Virtual manipulatives
   2. Algebra Tiles