

University of Arkansas – Fort Smith
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General Syllabus

MATH 38473 Mathematics Curriculum, Instruction, and Assessment

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 1

Prerequisites: MATH 23373 Structures of Arithmetic and MATH 23473 Informal Geometry, or MATH 22473 Geometry and Measurement II.

Effective Catalog: 2018~2019

I. Course Information

A. Catalog Description

Developmentally appropriate teaching strategies and support systems needed for introducing and developing the mathematical mind of the K-8 grade student. Consists of a classroom component and a field component.

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the prospective teacher will be able to:

1. Identify mathematical content typically taught in elementary/middle schools.
2. Identify and illustrate various strategies for teaching math at the elementary/middle level.
3. Identify and apply problem-solving techniques appropriate for elementary/middle math content.
4. Study and discuss strategies designed to increase comprehension of mathematical text.
5. Demonstrate knowledge of current developments in the area of math instruction.
6. Diagnose and design remediation for common student difficulties in mathematics.
7. Examine appropriate assessment techniques for evaluating the learning of mathematics.
8. Explore a variety of techniques for incorporating writing into the mathematics curricula.
9. Identify and evaluate techniques for incorporating appropriate technology into the mathematics curricula.

10. Evaluate equity issues in the mathematical classroom to facilitate success for learners of varying abilities, socioeconomic, and cultural backgrounds.
11. Demonstrate knowledge of professional materials available for teachers.

B. University Learning Outcomes

Analytical Skills

Quantitative Reasoning: Students will evaluate solutions by fellow students to compare strategies used in terms of correctness, ease of implementation, and flexibility. Students will solve problems using whole numbers and rational numbers, focusing on patterns in the various techniques of solving the problems. Students will critique numerous materials typical of an elementary or middle school classroom to determine if they fully meet the state requirements of that subject and/or topic. Students will assign and use numbers, read and data, create models, draw inferences, and support conclusions based on sound mathematical reasoning. Students will solve problems with whole numbers and rational numbers, and graphical representations. Students will solve problems using a variety of techniques, with the understanding that mathematics is a coherent set of patterns regarding numbers.

Communication Skills (written and oral)

Students will communicate proficiently while presenting a lesson to their classmates. Students will complete written reports based on classroom visits to area schools. Students will communicate while working in small groups and then communicate to their entire class their group members' strategies for solving problems.

Ethical Decision Making

Students will model ethical decision-making processes while working with other students 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. Students will be assigned classroom visits to schools in which they will observe and learn to respect cultural differences among teachers and students.

III. Major Course Topics

A. Common errors and misconceptions

1. Analyzing student work to determine student thinking and plans for re-teaching

B. How children learn math

1. Use current strategies such as Cognitively Guided Instruction to allow students to invent algorithms
2. Multiple strategies for operations with whole numbers and fractions such as partial quotients, expanded form, repeated subtraction, partial sums

- 3. Standards of Mathematical Practice
 - 4. Use of manipulatives to develop conceptual understanding
- C. Real-world problem solving
 - 1. Strategies such as guess-and-check, using tables, working simpler problems
- D. Math vocabulary and literature
 - 1. Use of literature in writing lesson plans
 - 2. Use of literature to teach math vocabulary
 - 3. Use of literature in creating stations
- E. Assessment and instruction
 - 1. Formative vs. summative assessment
 - 2. Finalizing student work to differentiate instruction
 - 3. Create 1-, 2-, and multi-step problems to meet state math standards
 - 4. Create assessments for a unit or a lesson
- F. Standards for mathematical practice and content
 - 1. Contrasting content standards and standards for mathematical practice
 - 2. Content standards organized in domains, clusters, and standards
 - 3. Evaluating lessons with respect to the standards for mathematical practice
- G. Lesson and unit planning
 - 1. Writing unit plans
 - 2. Writing lesson plans
 - 3. Evaluating lesson plans using a rubric
- H. Curriculum development and connections K-8
 - 1. Creating a vertical alignment chart for a given topic
 - 2. Evaluating textbook materials to determine if given standards are fully met
- I. Teaching mathematics equitably to all children
 - 1. Multiple Intelligences
 - 2. IEPs and 504 plans
- J. Using technology to teach mathematics
 - 1. Using websites to create stations
 - 2. Using websites to find lessons