

Boyce College
Department of Teacher Education

ED 311 Elementary Math, P-5, II

Semester: Fall

Time: TBA-

Location: TBA

Professor/Instructor: TBA

Email: Office –

Home:

Office Ph.#:

Home Ph:

Cell Ph.#:

Office Location:

Office Hours:

Course Description:

This course is designed to help preservice teachers broaden their content knowledge of elementary mathematics, specifically in the areas of measurement, geometrical concepts, probability and data analysis. The course is also designed to enhance preservice teachers' understanding of the ways in which children learn mathematics and to equip them with methods to teach the covered content areas to elementary students. This course will employ the use of manipulatives and hands-on learning as students seek to both understand and effectively communicate mathematical concepts and ideas. Field Experience Required: 8 Hours; Prerequisites: Admittance to the Teacher Education Program (TEP), MA 101 and MA 102.

Instructional Materials:

Texts: Van de Walle, J. (2009). *Elementary and middle school mathematics: Teaching developmentally*. 7th Edition. NY: Longman Publishing.

Sonnabend, T. (2010). *Mathematics for Teachers: Interactive Approach for Grade K-8*. 4th Edition. NY: Cengage Learning Inc.

Other: Cuisenaire math manipulative kit

The Boyce Teacher Education Program Mission and Theme: The primary purpose of the Boyce Teacher Education Program (TEP) is to provide Christ-centered quality teacher education, preparing teacher candidates for both Christian and public school teaching under the theme of *teachers as leaders*. The goal of the TEP for each teacher candidate is to develop the knowledge, the skills, the dispositions, and the intent to serve as a professional Christian educator. This goal is depicted in the conceptual framework logo below:

Insert Boyce Conceptual Framework Graphic Here

Methods of Instruction: Instruction in this course is designed to model effective teaching strategies that can be extended to the elementary classroom. This includes the use of group work and discussion, individual assignments, hands-on interaction with manipulatives, and the implementation of online resources.

Learning Outcomes: Each of the learning outcomes and learning activities of this course are aligned with the 10 Kentucky Teacher Standards, the KERA Initiatives and Core Content for Assessment, the NCTM Principles and Standards, and the EPSB Themes (all of which are outlined in the Course Alignment section). The outcomes and activities are listed below, followed by a chart displaying the how each is specifically aligned.

1. Demonstrate mastery of basic skills in covered content areas as well as an understanding of the underlying concepts involved. Specific activities designed to enhance this outcome include homework, quizzes, and tests for which explanations, and not just solutions, will be required.
2. Solve and explain mathematical problems using a variety of approaches, methods and materials and be able to demonstrate mathematical concepts using multiple representations.
3. Make and communicate connections both within mathematics and between mathematics, other content areas, and real world applications. A project involving mathematics and art will help to facilitate this outcome.
4. Develop lessons that effectively integrate a variety of teaching strategies, resources, and assessments and that account for multiple learning styles and abilities.
5. Use appropriate technology to further comprehension of mathematical ideas and understand how to implement technology as a valuable teaching and learning tool. A group project involving the use of geometer's sketch pad will assist in this area.
6. Emphasize problem-solving as essential to mathematics over rote formula usage and memorization. Where formulas are used, the student will demonstrate the ability to both develop them and explain why they work.
7. Understand the various ways children learn mathematics and the factors that are necessary to create a learning environment that encourages the development of critical thinking skills and mathematical reasoning.
8. Gain field experience by both observing and implementing instruction in an elementary classroom setting. Instructional experience should include opportunities for problem-solving and assessment and the appropriate use of both technology and manipulatives.

Learning Outcomes/ Activities	KY Teacher Standards	Core Content for Assessment	NCTM Principles and Standards	EPSB Themes
1	1	MA-2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 2.1.6, 2.2.1, 2.2.3, 3.1.1, 3.1.2, 3.1.3, 3.1.5, 3.2.1, 3.2.2, 3.3.1, 4.1.1, 4.1.2, 4.1.3, 4.2.1, 4.3.1, 4.4.1, 4.4.2, 4.4.3	P2, P3, P4, CS3, CS4,, CS5, PS1, PS2, PS3	
2	1	MA-2.1.2, 2.1.3, 4.1.3	P1, P3, P4, CS3, CS4,, CS5, PS1, PS2, PS3, PS5	Diversity
3	1	MA-2.1.2, 2.1.3, 2.1.4, 2.1.6, 2.2.1, 2.2.3, 3.1.1, 3.1.2, 3.1.3, 3.1.5, 4.1.2, 4.4.3	P2, CS3, CS4, CS5, PS4	
4	2, 7	Covered content areas will vary	P1-P6, content will vary, PS3	Assessment

5	6, 8	Covered content areas will vary	P6, PS5	
6		MA-2.1.2, 2.1.3, 2.1.4, 2.2.1, 2.2.3, 3.1.1, 3.1.2, 3.1.3, 3.1.5, 3.2.1	P4, CS3, CS4, CS5, PS1, PS2	
7	3, 4, 7	MA-2.1.6, , 4.3.1	P1, P2, P3, P4	Diversity
8	1-10	Covered content areas will vary	P1-P6, content will vary, PS1, PS3, PS5	Assessment

Note: The indices used under the Core Content for Assessment heading may be found in the Content document at education.ky.gov. Under the NCTM Principles and Standards heading, P1 refers to Principle 1, CS1 refers to Content Standard 1, and PS1 refers to Process Standard 1. The KTS Standards and EPSB Themes are numbered and/or listed below.

Course Alignments – This course is aligned with...

A. Kentucky Teacher Standards (KTS)

STANDARD 1: DEMONSTRATE APPLIED CONTENT KNOWLEDGE

STANDARD 2: DESIGN AND PLAN INSTRUCTION

STANDARD 3: CREATE AND MAINTAIN LEARNING CLIMATE

STANDARD 4: IMPLEMENT AND MANAGE INSTRUCTION

STANDARD 5: ASSESS AND COMMUNICATE LEARNING RESULTS

STANDARD 6: DEMONSTRATE THE IMPLEMENTATION OF TECHNOLOGY

STANDARD 7: REFLECT AND EVALUATE TEACHING AND LEARNING

STANDARD 8: COLLABORATE WITH COLLEAGUES/PARENTS/OTHERS

STANDARD 9: EVALUATE TEACHING AND IMPLEMENT PROFESSIONAL DEVELOPMENT

STANDARD 10: PROVIDE LEADERSHIP WITHIN SCHOOL/COMMUNITY/PROFESSION

B. KERA Initiatives: Specifically this course seeks to align with the Core Content for Assessment standards regarding the essential mathematics content for grades K-5. This document lists key mathematics skills and concepts that students are expected to learn in 5 main areas of mathematics:

1. Number Properties and Operations
2. Measurement
3. Geometry
4. Data Analysis and Probability
5. Algebraic Thinking

A detailed description of the Core Content for Assessment may be found at <http://www.education.ky.gov>.

C. NCTM Principles and Standards

Principles

1. Equity
2. Curriculum
3. Teaching

Content Standards

1. Number
2. Algebra
3. Geometry

Process Standards

1. Problem Solving
2. Reasoning and Proof
3. Communication

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|---------------|--------------------------------|--------------------|
| 4. Learning | 4. Measurement | 4. Connections |
| 5. Assessment | 5. Data Analysis & Probability | 5. Representations |
| 6. Technology | | |

D.EPSB Themes:

- Diversity (with specific attention to exceptional children including the gifted and talented, cultural and ethnic diversity)
- Assessment (developing skills to assess student learning)
- Literacy/Reading
- Closing the Achievement Gap (identify what courses emphasize strategies for closing the gap)

Course Requirements: The requirements for this course consist of the following components with related point values:

Component	Description	Point Value
Exam #1	Probability and Statistics	100
Exam #2	Units and Measurement	100
Exam #3	Concepts in Geometry	100
Homework	Textbook problems with written explanations	150
Group Project	Investigations with Geometer's Sketch Pad	25
Project	Mathematics and Art	25
Skills Quiz	Area and Perimeter	25
Skills Quiz	Elementary Statistics	25
Lesson Plan #1	Topic of Choice (must include manipulatives and assessment)	75
Lesson Plan #2	Topic of Choice (must include assessment and technology)	75
Field Experience	8 hours including both observation and instruction	100
Total Points Possible		800

Evaluation:

By keeping track of your scores, you can easily tally your final grade.

<u>Points</u>	<u>Grade</u>
720-800	A
640-719	B
560-639	C
480-559	D

Course Schedule:

- Teaching in line with the NCTM Principles and Standards
- Probability and principles of counting
- Graphical representations of data and data analysis
- Units and measurement—a hands-on approach
- Area , perimeter, volume—developing formulas and understanding why they work
- Similarity and congruence—special emphasis on triangles
- Euclidean geometry and the Cartesian coordinate system
- Rigid motions, symmetry and transformations in the plane
- Designing effective lesson plans and assessments