

**Boyce College**  
**Department of Teacher Education**

**ED 310 Elementary Math –P-5, I**

**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 number theory, decimals and place value, fractions, algebraic thinking and problem solving. 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*. 4<sup>th</sup> 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 group project involving mathematical connections to children’s literature 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.
6. Emphasize problem-solving as essential to mathematics over rote formula usage and memorization.
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-1.1.1, 1.1.2, 1.1.3, 1.2.1, 1.3.1, 1.3.3, .5.1, 1.5.2, 5.1.1, 5.1.2, 5.1.3, 5.3.1	P3, P4, CS1, CS2, PS1, PS2, PS3	
2	1	MA-1.1.1, 5.1.2	P1, P3, P4, CS1, CS2, PS1, PS2, PS3, PS5	Diversity
3	1, 8	MA-1.1.1, 1.1.2, 1.2.1, 1.3.1, 1.5.1, 5.1.2, 5.2.1, 5.3.1	P2, CS1, CS2, PS4	Literacy/reading
4	2	Covered content areas will vary	P1-P6, content will vary, PS3	Assessment

5	6	MA-1.3.1	P6, PS5	
6		MA-1.1.1, 1.1.2, 1.3.1, 1.3.3, 1.5.1, 5.1.1, 5.1.2, 5.3.1	P4, CS1, CS2, PS1	
7	3, 4, 7	MA-1.1.1, 5.1.2	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 [www.education.ky.gov](http://www.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 [www.education.ky.gov](http://www.education.ky.gov).

#### **C. NCTM Principles and Standards**

##### Principles

1. Equity
2. Curriculum
3. Teaching
4. Learning
5. Assessment

##### Content Standards

1. Number
2. Algebra
3. Geometry
4. Measurement
5. Data Analysis & Probability

##### Process Standards

1. Problem Solving
2. Reasoning and Proof
3. Communication
4. Connections
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	Number Theory and Operations	100
Exam #2	Decimal and Fractions	100
Exam #3	Algebraic Relationships and Problem Solving	100
Homework	Textbook problems with written explanations	150
Project	Real World Connections to Children's Literature	25
Skills Quiz #1	Operations with Integers	25
Skills Quiz #2	Operations with Decimals	25
Skills Quiz #3	Operations with Fractions	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
<b>Total Points Possible</b>		<b>800</b>

### **Evaluation:**

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

<b><u>Points</u></b>	<b><u>Grade</u></b>
720-800	A
640-719	B
560-639	C
480-559	D
479 & below	F

**Course Schedule:**

- An introduction to how children learn mathematics
- Teaching in line with the NCTM Principles and Standards
- Number theory and basic operations—how they work and why
- Decimals, fractions and the Real number system
- Algebraic concepts and problem solving
- Designing effective lesson plans and assessments