Salisbury University Department of Mathematical Sciences

MATH 130: Fundamental Concepts I
Syllabus (Tentative)

Description: Elementary education majors will review and extend topics of number and operation and early algebra that are taught in elementary school. Focus is on developing a deep understanding of number, addition, subtraction, multiplication and division, introductions to number theory, and algebraic expressions and equations. There will also be a focus on looking at the tools for the instruction of these concepts in an elementary or middle school setting. 3 Hours Credit: Meets three hours per week. Does not meet General Education requirements.

Prerequisites: Declared elementary education or early childhood education major.

Credit: Credit may only be received for one of MATH 103 and MATH 130.

Intended audience: Students in the Elementary Education Program

Objectives: Upon completion of this course, students will be able to:

1. solve problems involving factors, multiples, place value, and the four arithmetic operations with whole numbers and rational numbers.
2. write problems of speci ed types to illustrate the use of factors, multiples, place value, and each of the four arithmetic operations with whole numbers and rational numbers.
3. con dently and exibly use a variety of algorithms for operations with whole numbers and rational numbers.
4. explain why an arithmetic algorithm produces the desired result, using diagrams as helpful and identifying relevant mathematical properties as applicable.
5. identify the appropriate use of the properties of operations (such as associativity and closure for addition and multiplication).
6. identify algebraic patterns, explain them using properties of operations, and write and interpret number sentences that involve variables
7. to evaluate samples of student work for quality of thinking and generalizability of the student's approach and will be able to recognize and identify common student misconceptions.
8. implement techniques that can be used to teach Common Core State Standards in the areas of Number & Operations in Base Ten and Number and Operations { Fractions.

Textbook: *Reconceptualizing Mathematics*, 3rd edition by Judith Sowder, Larry Sowder, and Susan Nickerson

Technology: Mathematical software accessible via SU computer network. Digital mathematical calculators such as Desmos may be required. GeoGebra math applets for elementary school at: https://www.geogebra.org/m/xnrmmkjt.

Topic	Weeks
The base 10 place value system Understanding place value (alternative bases may be explored) and visual representation of real numbers. Representations to include base 10 blocks, decimal squares, and number lines.	2.0
The operations of addition and subtraction Ways of thinking about and representing the operations on real numbers, including a look at traditional and nontraditional algorithms, and children's views. A look at the di erent problem types involving addition and subtraction, the use of properties of operations (i.e., the eld axioms).	2.5-3.0
The operations of multiplication and division Ways of thinking about and representing the operations on real numbers, including a look at traditional and nontraditional algorithms and children's views. May also be extended to rational numbers when appropriate. A look at the di erent conceptions of multiplication and division, the use of properties of operations (i.e., the eld axioms).	2.5-3.0
Fractions Understand fractions as numbers, which can be represented by area and set models and by lengths and on a number line. Explain the rationale for de ning and representing equivalent fractions and the operations upon fractions.	4.0-5.0
Early algebra To include the properties of operations, pattern seeking, number sentences and expressions, the use of the equal sign and variables.	1.0
Tests	1.0
Total	14

Evaluation

Assignments, Quizzes	20 – 40%
Tests	30 – 60%
Comprehensive Final Examination	20 – 30%

- Free tutoring is available for this course in the Spring and Fall semesters.
- **Writing Across the Curriculum**: Written work must clearly communicate a meaningful message. Put the best possible e ort toward organizing meaningful ideas, using an appropriate voice, creating uent sentence structures, and editing with the conventions of formatting, mechanics, grammar, and spelling. Evidence of lack of attention to rereading, revising and editing will result in signi cant grade penalties.
- Clear descriptions of thought processes, evidence of critical thinking, and e ective communication must be demonstrated in written work
- **NOTE**: Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.