

Salisbury University Department of Mathematical Sciences

MATH 230: Fundamental Concepts II
Syllabus (Tentative)

Description: Elementary education majors will further develop their algebraic, proportional, and geometric reasoning as they continue their study of fundamental concepts in elementary and middle school curricula. The focus is on developing a deep understanding of ratios, proportional relationships, algebraic equations, functions, geometric thinking, and measurement concepts. They will also examine the tools for the instruction of these concepts in an elementary or middle school setting. 3 Hours Credit: Meets three hours per week. Meets General Education IVB or IVC.

Prerequisites: C or better in MATH 130.

Credit: Credit may only be received for one of MATH 104 and MATH 230

Intended audience: Students in the Elementary Education Program

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

1. understand algebraic concepts and procedures encountered in middle school curricula, including working with signed numbers, multiple representations of functions and the role of patterns and change. Write problems of specified types to illustrate the use of factors, multiples, place value, and each of the four arithmetic operations with whole numbers and rational numbers.
2. identify problems that involve proportional reasoning and solve them using conceptual tools such as tape diagrams.
3. work with a variety of situations that involve proportional reasoning such as unit rates and scale factors
4. solve problems involving geometric shapes and measures of angles, length, area, surface area, and volume.
5. describe how learning of measurement should progress from informal units and strategies to formal units and formulas.
6. identify definitions and properties of common geometric shapes; given properties, a student will be able to identify the shape(s) that have those properties.
7. identify and use the properties of congruent and similar geometric shapes.
8. implement techniques that can be used to teach Common Core State Standards in the areas of Ratios & Proportions, Measurement & Data, and Geometry.

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

Technology: Mathematical software accessible via SU computer network or online. Digital mathematical calculators such as Desmos may be required.

Topic	Weeks
Multiplicative Reasoning, Percents, Ratios, Rates and Proportions Exploring multiplicative reasoning conceptually and with models such as tape diagrams and double number lines. Working with percents, ratios, and rates in contextualized problems that foster the use of multiple solution strategies. Will include connections to decimals.	4.5-5.5
Big Ideas in Geometry and Measurement A look at planar shapes and figures in space. Exploring the basic concepts of perimeter, area, and volume conceptually and via formula. Looking at the basic concepts of measurement including the use of nonstandard units of measure and conversion amongst standard units. A look at congruence and similarity, properties, and categorizations of shapes .	4.0
Reasoning about Algebra and Change Basic function concept; notation; representation - table, graph, formula; linear and non-linear functions; creation and use of functions and equations to model situations. Modeling with signed numbers. A look at slope as rate of change and its connection to proportional reasoning.	3.0-4.0
Tests	1.5
Total	14

Evaluation

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

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- 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 effort toward organizing meaningful ideas, using an appropriate voice, creating fluent 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 significant grade penalties.
 - Clear descriptions of thought processes, evidence of critical thinking, and effective 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.