

Southern Connecticut State University
MAT 106
Mathematics for Elementary Education II

I. **Catalog Description:** Topics include ratio, proportion, percent, rational numbers, measurement, probability and statistics, problem solving, mathematical reasoning and connections.

II. **Purpose:**

The purpose of this course is to continue to provide students with a deeper understanding of the mathematics being taught in elementary schools and to familiarize them through performance with the Standards for Mathematical Practice, which is part of the Common Core State Standards. It is required of all students in an elementary school certification program.

III. **Credit**

MAT 106 carries three semester-hours of university credit.

IV. **Prerequisite:**

C- or better in MAT 105

V. **Format**

MAT 106 is offered in the lecture-discussion format. Activities are hands-on activities and are integrated into the course. This course will have three contact hours per week.

VI. **Quantitative Reasoning:** This course satisfies the University's Liberal Education Program (LEP) requirement in Quantitative Reasoning (QR). It addresses the key elements of QR as indicated in section VIII, Course Objectives. Further, as an LEP Foundations course, it will

- address at least one *Area of Knowledge and Experience*, e.g. Cultural Expressions (tangram activity or geometry or symmetry), Global Awareness (Pythagorean Theorem or geometry); or Natural World (statistics or measurement); Mind and Body (percents, proportions or statistics);
- incorporate at least one *Discussion of Values*, e.g. Human Diversity (tangrams, statistics), Rational Thought (geometric constructions or spatial visualization), Civic Engagement (using statistics to make a case for change), or Ethical Judgment (discussion re. emphasis on drill/skill practice vs. problem-solving activities into their classroom – the “Math Wars” debate);
- address at least one embedded competency in a significant manner, e.g. Creative Thinking (project/poster), Information Literacy (library project), or Oral Communication (class presentations), and
- present Quantitative Reasoning in context.

VII. **Course Objectives:** By the end of this course, a successful student should be able to do the following:

- A. Students will develop and extend their understanding of fractions, decimals, ratio and proportion, and percents. (QR1, QR3, QR4, QR5)

- B. Students will recognize and generate equivalent forms of commonly used fractions, decimals, and percents, and be able to compare and order these numbers.
- C. Students will understand, and be able to model, arithmetic operations on fractions and decimals, and will be able to estimate the results of arithmetic operations on fractions and decimals. (QR1, QR3, QR4, QR5)
- D. Students will understand and apply the basic concepts of probability.
- E. Students will be able to represent data in various forms and draw conclusions from the data. (QR2)
- F. Students will be able to compute measures of central tendency (mean, median, mode) and understand what each measure indicates for a given set of data. (QR4)
- G. Students will be able to classify shapes according to their properties.
- H. Students will be able to compute perimeter, area, surface area, and volume (QR4)

VIII. Outline

- A. Rational numbers and Proportional Reasoning (30%)
 - 1. The Set of Rational Numbers
 - 2. Addition and Subtraction of Rational Numbers
 - 3. Multiplication and Division of Rational Numbers
 - 4. Ratios, Proportions, and Proportional Reasoning
- B. Decimals: Rational Numbers and Percents (30%)
 - 1. Introduction to Decimals
 - 2. Operations on Decimals
 - 3. Nonterminating Decimals
 - 4. Percents and Interest
 - a. Mental Math with Percent
 - b. Estimations with Percents
- C. Probability and Statistics (10%)
 - 1. How Probabilities Are Determined
 - 2. Displaying Data
 - 3. Measures of Central Tendency: Mean, median, mode
- D. Introductory Geometry (30%)
 - 1. Geometric Figures
 - 2. Perimeter and Areas
 - 3. Surface Area and Volume
 - 4. Tessellations
 - 5. Symmetry

IX. **Assessment:** Individual instructors may vary assessment modes, but typically grades will be based on a combination of homework assignments, quizzes, and exams.

X. **Recommended Text**

1. *Mathematics for Elementary Teachers: A Conceptual Approach*, Bennett, Burton, Nelson, and Ediger, 10th Edition, McGraw Hill, 2016.

XI. **Bibliography**

1. *A Problem Solving Approach to Mathematics for Elementary School Teachers*, Billstein, R., Libeskind, S., and Lott, J., 13th Edition, Pearson, 2019.
2. *Learning Mathematics in Elementary and Middle Schools: A Learner-Centered Approach*, Cathcart, W., Pothier, Y., Vance, J. & Bezuk, N., 6th edition, Pearson Merrill Prentice Hall: Upper Saddle River, NJ, 2014.

XII. **Waiver Policy:** This course may not be waived.

XIII. **Prepared and Approved**

Prepared in April 2023.

Approved by the Mathematics DCC on May 2, 2023.

Approved by the Mathematics Department on October 26, 2023.

XIV. **Preparers**

2023: K. Kruczek and Y. Lee