

MATH 328 Mathematics for Elementary Teaching II

1. Catalog Description

MATH 328 Mathematics for Elementary Teaching II

4 units

Prerequisite: MATH 227 with a grade of C- or better or consent of instructor.

Introduction to rational and real numbers, probability and counting techniques, statistics, and geometry. Computer applications. 4 lectures.

2. Required Background or Experience

Completion of Math 227 with a grade of C- or better.

3. Learning Objectives

Mathematical Content

Rational and Real Numbers

The student should:

- a. Understand fundamental relations (greater than, less than, equal to) and operations (addition, subtraction, multiplication, and division) on rational numbers and real numbers. This includes both the ability to write word problems as well as the ability to solve those problems using multiple representations, standard algorithms, and nonstandard algorithms.
- b. Understand the special roles of the unit and equivalence in the rational number system.
- c. Understand the rational numbers as fractions, repeating or terminating decimals, and percents including how to work with multiple forms of a rational number.
- d. Understand ratios, proportions and proportional reasoning.
- e. Understand the connections between probabilities, ratios, proportions, decimals and percents.
- f. Understand the properties of irrational numbers including their similarities and differences with the rational numbers.
- g. Understand fundamental relations (is a subset of, is equal to) and operations (union, intersection, complement) of sets.
- h. Understand other topics appropriate to teaching K-8 mathematics may be included at the instructor's discretion.
- i. Understand investigate the development of children's mathematical thinking.

As time permits and at the instructor's discretion topics from the following lists will be covered.

Probability and Counting

The student should:

- a. Understand a variety of representations for probabilities of one and two stage experiments, appealing to notions of complementary, mutually exclusive, dependent, and independent events.
- b. Understand basic counting techniques including the use of trees and organized lists.
- c. Use different counting techniques to calculate theoretical probabilities.

Statistics

The student should:

- a. Collect, organize, and represent data through graphs and tables, and given a representation of data, the student will be able to interpret and draw conclusion about the data considering possible effects of bias.
- b. Understand how mean, median, mode, and range describe a set of data. ting in investigative experiences in mathematics.
- c. Develop multiple representations (physical, pictorial, and symbolic) for ' mathematical ideas.
- d. Explain why mathematics makes sense by integrating the English language with conventional mathematical notation, mathematical definitions, and concrete representations.
- e. Write and solving mathematical problems and exercises.
- f. Watch and analyzing video of K-8 students and teachers engaging with mathematics.
- g. Address their fears and apprehensions towards mathematics.

4. Text and References

- Sowder, J., Sowder, L. & Nickerson, S. Reconceptualizing Mathematics for Elementary School Teachers, W.H. Freeman and Co., New York, NY.

5. Minimum Student Materials

Required text, and activity materials provided by instructor.

6. Minimum University Facilities

Mathematics education classroom equipped with materials and technology.

7. Content and Method

<u>Topic</u>	<u>Lecture/Activity</u>
Chapter 6: Meanings for Fractions	8
6.1 – Understanding the Meanings of $\frac{a}{b}$	
6.2 – Comparing Fractions	
6.3 – Equivalent (Equal) Fractions	
6.4 – Relating, Fractions, Decimals and Percents	
Chapter 4/7: Computing with Fractions	10
4.1 – Operating on Whole Numbers and Decimal Numbers	
7.1 – Adding and Subtracting Fractions	
7.2 – Multiplying by a Fraction	
7.3 – Dividing a Fraction	
Chapter 8: Multiplicative Comparisons and Multiplicative Reasoning	4
8.1 – Quantitative Analysis of Multiplicative Situations	
8.2 – Fractions in Multiplicative Comparisons	
Chapter 9: Ratios, Rates, Proportions and Percents	8
9.1 – Ratio as a Measure	
9.2 – Comparing Ratios	
9.3 – Percents in Comparisons and Changes	
Additional Topics from Chapters 27 – 31	<u>6</u>
	Total
	36

Method

Lecture, discussion, and activity

8. Methods of Assessment

Class activities, homework and lab assignments, term projects, midterm tests or quizzes, final examination