MATH 328  Mathematics for Elementary Teaching II

1. **Catalog Description**

   MATH 227, 328, 329  Mathematics for Elementary Teaching I, II, III  (4) (4) (4)

   Introduction to set theory, number theory, real numbers, probability, statistics and geometry. Computer applications. 4 lectures. MATH 227 prerequisite: Passing score on ELM examination, or an ELM exemption, or credit in MATH 104. MATH 328 prerequisite: MATH 227 with a grade of C- or better or consent of instructor. MATH 329 prerequisite: MATH 328.

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 will understand:
     a. 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. The special roles of the unit and equivalence in the rational number system.
     c. The rational numbers as fractions, repeating or terminating decimals, and percents including how to work with multiple forms of a rational number.
     d. Ratios, proportions and proportional reasoning.
     e. The connections between probabilities, ratios, proportions, decimals and percents.
     f. 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. Other topics appropriate to teaching K-8 mathematics may be included at the instructor’s discretion.
     i. 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 will:
     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 will:
  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) Developing multiple representations (physical, pictorial, and symbolic) for mathematical ideas.
  d) Explaining why mathematics makes sense by integrating the English language with conventional mathematical notation, mathematical definitions, and concrete representations.
  e) Writing and solving mathematical problems and exercises.
  f) Watching and analyzing video of K-8 students and teachers engaging with mathematics.
  g) Addressing their fears and apprehensions towards mathematics.

4. **Text and References**


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**

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<th>Topic</th>
<th>Lect/Activity</th>
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<td>Chapter 6: <strong>Meanings for Fractions</strong></td>
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<tr>
<td>6.1 – Understanding the Meanings of $\frac{a}{b}$</td>
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<td>6.2 – Equivalent (Equal) Fractions</td>
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<tr>
<td>6.3 – Relating, Fractions, Decimals and Percents</td>
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<td>6.4 – Estimating Fractional Values</td>
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<td>Chapter 4/7: <strong>Computing with Fractions</strong></td>
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<tr>
<td>4.1 – Operating on Whole Numbers and Decimal Numbers</td>
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<tr>
<td>7.1 – Adding and Subtracting Fractions</td>
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<td>7.2 – Multiplying by a Fraction</td>
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<td>7.3 – Dividing a Fraction</td>
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<tr>
<td>Chapter 8: <strong>Multiplicative Comparisons and Multiplicative Reasoning</strong></td>
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8.1 – Quantitative Analysis of Multiplicative Situations
8.2 – Fractions in Multiplicative Comparisons

Chapter 9: **Ratios, Rates, Proportions and Percents**  
9.1 – Ratio as a Measure  
9.2 – Comparing Ratios  
9.3 – Percents in Comparisons and Changes

Additional Topics from Chapters 27 – 31  

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<thead>
<tr>
<th>8</th>
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<tbody>
<tr>
<td>6</td>
<td>36</td>
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**Methods of Assessment**

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