

MATHEMATICS FOR ELEMENTARY SCHOOL TEACHERS
MATH 2000

Page 1 of 3

1.0 Course Objectives

- 1.1 Overview of Content and Purpose:** A course for prospective elementary school teachers that involves formulating proofs based upon definition and logic, mathematical reasoning, conjecturing, problem-solving, and connecting mathematical thought to its applications. Topics include number theory, real numbers, probability and statistics and geometry.
- 1.2 For Whom Intended:** Course intended for upper division elementary education majors.
- 1.3 Prerequisites:** Prerequisites include a C- or better in Math 1310/1314 and the PPST.
- 1.3 Unusual Circumstances:** No unusual circumstances. Effective and current methods of instruction for the elementary classroom will be utilized as the course combines content and pedagogy in mathematics.

2.0 Objectives

2.1 Performance Objectives for the Students:

The Student will:

1. Use problem-solving approaches to investigate, understand, and solve problems of mathematical content.
2. Acquire confidence in using mathematics meaningfully.
3. Develop common understandings of mathematical ideas, including the role of definitions and proof.
4. Formulate and solve problems that involve collecting and analyzing data and statistics and interpreting graphs.
5. Perform multistage experiments and solve problems with tree diagrams and geometric probabilities.
6. Understand and calculate measures of central tendency and variation.
7. Develop concepts and number sense for fractions and decimals, and solve problems involving fraction and decimals.
8. Relate geometric ideas to number and measurement ideas in two- and-three dimensional geometry prove postulates and apply knowledge to solve problems.
9. Perform investigations of geometric concepts so that general properties emerge and are used as the basis for conjectures and deductions.

**MATHEMATICS FOR ELEMENTARY SCHOOL TEACHERS
MATH 2000**

Page 2 of 3

3.0 Content and Organization

- 3.1 Topics:**
1. Number Theory
 - a. Divisibility rules
 - b. Prime and composite numbers
 - c. Greatest common divisor, Euclidean algorithm, least common multiple.
 2. Rational Numbers as Fractions
 - a. Fractions and rational numbers
 - b. Addition and subtraction of rational numbers
 - c. Multiplication and division of rational numbers
 - d. Ordering rational numbers
 - e. Ratio and proportion
 - f. Exponents
 3. Decimals
 - a. Decimals and decimal operations
 - b. Decimals and their properties
 - c. Percents
 - d. Computing interest
 4. Probability and statistics
 - a. How probabilities are determined
 - b. Multistage experiments (tree diagrams and geometric probabilities)
 - c. Using simulations in probability
 - d. Statistical graphs
 - e. Measures of central tendency and variation
 5. Introductory geometry
 - a. Basic notions in geometry
 - b. Polygonal curves
 - c. Angles
 - d. Geometry in three dimensions
 6. Other related topics

4.0 Teaching Methodology

- 4.1 Methods To be Used:**
1. Instruction involving small groups, cooperative learning, activity based learning (utilizing computers and manipulatives) and modified lectures.
 2. Students will be active participants in class discussions and involved in classroom presentations.
 3. 3 classroom hour/week

5.0 Evaluation

- 5.1 Basis for Evaluating Student Performance:**
1. Students will be submitting group projects indicating depth and breadth of comprehension material, taking take-home and in-class exams, entering daily journal writings, performing in-class activities, doing homework assignments, and submitting a portfolio summarizing the semester's work.

**MATHEMATICS FOR ELEMENTARY SCHOOL TEACHERS
MATH 2000**

Page 3 of 3

2. Final grade will be based on the total points earned on all work submitted for grades. (Group projects and test will account for approximately 50% of the grade, classroom and laboratory activities constitute approximately 15%, journal entries/homework 10% and the portfolio/final approximately 25%.)

6.0 Resource Material

- 6.1 Textbook(s) or Other Required Readings:** *A Problem Solving Approach to Mathematics for Elementary School Teachers*, 5th edition. Billstein/Libeskind/Lott.
- Mathematics Activities for Elementary School Teacher: A Problem Solving Approach*, 2nd edition. Dolan/Williamson/Muri.
- Curriculum and Evaluation Standards of School Mathematics*, National Council of Teachers of Mathematics, Inc. Reston, VA: 1989.
- Professional Standards for Teaching Mathematics*, national Council of Teachers of Mathematics, Ind. Reson, VA : 1991
- 6.2 Current Bibliography of Resources:** *The Art of Problem Posing*, Brown, S., and M. Walter, Philadelphia: Franklin Institute Press, 1991.
- Reading the Numbers: A Survival Guide to the Measurements, Numbers, and Sizes Encountered in Everyday Life*. Blacksm, M. New York: Penguin Group, Viking Penguin Inc., 1989.
- The Mathematical Tourist: Snapshots of Modern Mathematics*, Peterson. I., New York: W.H. Freeman and Company, 1988.
- Fraction Bars*, Bennett, A., Jr. and P. Davidson, Palo Alto, CA: Creative Publications.