MISSOURI WESTERN STATE UNIVERSITY

COLLEGE OF LIBERAL ARTS AND SCIENCES

DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS, AND PHYSICS

COURSE NUMBER: MAT 352

COURSE NAME: Mathematics for Elementary and Middle School Teachers I

COURSE DESCRIPTION:

Problem solving; set theory; logical reasoning; numeration systems; addition, subtraction, multiplication, and division algorithms; number theory; mathematical applications. Must be taken concurrently with MAT 351.

PREREQUISITE:

Grade of C or better in EDU 351. (Not applicable to the major or minor in mathematics.) Elementary and Middle School education majors may not take the course until officially admitted to teacher education.

TEXT:

Elementary Mathematics of Teachers by Parker & Baldridge (and accompanying elementary math text books); Sefton-Ash Publishing

COURSE OBJECTIVE:

The objective of the MAT 352/353 course sequence is to provide prospective elementary and middle school teachers with the mathematical knowledge that they will need to teach mathematics in the elementary or middle school.

STUDENT COMPETENCIES:

In order to meet the above objective, successful students will:

1. Communicate mathematics accurately and clearly.
2. Apply various problem-solving strategies in order to solve non-routine problems.
3. Determine the n^{th} term of a sequence.
4. Describe sets using set notation.
5. Perform set operations.
6. Represent base ten numbers in various numeration systems.
7. Perform arithmetic calculations involving whole numbers, integers, rational numbers (in fraction and decimal form), and real numbers.
8. Apply addition, subtraction, multiplication, and division algorithms for whole numbers.
9. Apply various mental mathematics and estimation strategies in arithmetic computations.
10. Apply divisibility tests.
11. Identify prime and composite numbers.
12. Compute the greatest common divisor and the least common multiple.
13. Use whole numbers, integers, rational numbers (in fraction and decimal form), and real numbers in problem solving.

COURSE OUTLINE:

1. An Introduction to Problem Solving
   - A. Explorations with Patterns
   - B. Mathematics and Problem Solving
   - C. Algebraic Thinking
   - D. Logic: An Introduction (optional)

II. Sets, Whole Numbers, and Functions
   - A. Describing Sets
   - B. Other Set Operations and Their Properties
   - C. Addition and Subtraction of Whole Numbers
   - D. Multiplication and Division of Whole Numbers
   - E. Functions

III. Whole-Number Computation
   - A. Numeration Systems
   - B. Algorithms for Whole-Number Addition and Subtraction
   - C. Algorithms for Whole-Number Multiplication and Division
   - D. Mental Mathematics and Estimation for Whole-Number Operations

IV. Integers and Number Theory
   A. Integers and the Operations of Addition and Subtraction
   B. Multiplication and Division of Integers
   C. Divisibility
   D. Prime and Composite Numbers
   E. Greatest Common Divisor and Least Common Multiple

V. Rational Numbers and Fractions
   A. The Set of Rational Numbers
   B. Addition and Subraction of Rational Numbers
   C. Multiplication and Division of Rational Numbers
   D. Proportional Reasoning

VI. Decimals, Percents, and Real Numbers
   A. Introduction to Decimals
   B. Operations on Decimals
   C. Nonterminating Decimals
   D. Percents
   E. Real Numbers