Millersville University
Math 104
Fundamentals of Mathematics I, 3 credits

Course Description:

Mathematics content which elementary and special education teachers of mathematics at any level need to know and understand before beginning to teach. Math 104 is designed to equip all such majors with sufficient knowledge and facility in mathematics for teaching mathematics effectively at the elementary level. The course includes an examination of problem solving, sets and logic, number systems, algorithmic structure, number theory, and the properties of integers, rational and real numbers. Attention will be given to how the content addresses the PA Department of Education Mathematics *Standards* and the NCTM *Principles and Standards for School Mathematics*.
This course is required for all elementary education and special education majors.

Prerequisite: At least an 80% passing score on the Mathematics Department Basic Skills Test prior to course enrollment.

Course Objectives: Students will be able to

- Demonstrate knowledge of the concepts, procedures and skills necessary to teach the structure of number systems and arithmetic operations.
- Communicate and model important mathematical ideas related to number systems and arithmetic operations using a variety of strategies.
- Demonstrate appropriate and correct application of mathematics terminology and symbolism for number systems and arithmetic operations.
- Demonstrate the appropriate use of physical and technological tools for representing and connecting mathematical ideas within number systems and arithmetic operations.
- Demonstrate the ability to transfer knowledge and thinking strategies to new situations.

Assessment Tools:
Instructors will make use of a variety of assessment tools in making sure that the students meet the objectives of the course. These may include: in-class activities, graded assignments, projects, presentations or quizzes, as well as exams and a final.

Course Outline:

Topic	***Section (Billstein)***
Pattern Exploration	1.1
Mathematical Problem Solving	1.2
Algebraic Thinking	1.3
Logic	1.4
Describing Sets	2.1
Set Operations and Properties	2.2
Addition and Subtraction of Whole Numbers	2.3
Multiplication and Division of Whole Numbers	2.4
Functions	2.5
Numeration Systems	3.1
Algorithms for Addition and Subtraction of Whole Numbers	3.2
Algorithms for Multiplication and Division of Whole Numbers	3.3

Mental Mathematics and Estimation	3.4
Addition and Subtraction of Integers	4.1
Multiplication and Division of Integers	4.2
Divisibility Concepts	4.3
Prime and Composite Numbers	4.4
Greatest Common Factors and Least Common Divisors	4.5
Rational Numbers	5.1
Addition and Subtraction of Rational Numbers	5.2
Multiplication and Division of Rational Numbers	5.3
Proportional Reasoning	5.4
Decimals	6.1
Operations on Decimals	6.2
Nonterminating Decimals	6.3
Percents	6.4
Real Number System	6.6

Required Materials:

- Textbook: Mathematics for Elementary School Teachers, 8th Edition, Billstein et al.
- Millersville University Overhead Manipulative Kit (available in bookstore)
- Calculator: (TI-34II will be used for some class instruction)