

GEORGIA PERIMETER COLLEGE  
MATHEMATICS ACADEMIC GROUP  
COMMON COURSE OUTLINE

COURSE ABBREVIATION	Math 2008
CREDIT HOURS	3
COURSE TITLE	Foundations of Numbers and Operations
PREREQUISITES	Successful completion of any college level math course

CATALOG DISCRIPTION

This course is an Area F introductory mathematics course for early childhood education majors. This course will emphasize the understanding and use of the major concepts of numbers and operations. As a general theme, strategies of problem solving will be used and discussed in the context of various topics.

EXPECTED EDUCATIONAL RESULTS

Upon completion of this course, students will be able to do the following:

1. Understand numbers, ways of representing numbers, relationships among numbers, and number systems
2. Understand meanings of operations and how they relate to one another
3. Compute fluently and make reasonable estimates
4. Apply multiple problem solving strategies and understand how approaches to solutions relate to one another
5. Use Venn diagrams to illustrate the set operations union, intersection, and complement
6. Represent and interpret functions verbally, numerically, graphically and symbolically
7. Distinguish between deductive and inductive reasoning and valid and invalid arguments
8. Understand the role of place value and notation in various numeration systems
9. Use mental arithmetic to perform basic calculations
10. Use tests for divisibility and determine prime factorization, GCF and LCM
11. Use integers and rational numbers to demonstrate concepts of order and equivalence
12. Use rational and irrational numbers in problem-solving settings

EXPECTED EDUCATIONAL RESULTS (OPTIONAL)

13. gather, organize, present and interpret data numerically, graphically and verbally
14. solve problems using linear, square and cubic units of measure

GENERAL EDUCATION OUTCOMES

- I. This course addresses the general education outcome related to effective individual and group problem-solving and critical-thinking skills as follows:
  1. Students develop their problem-solving skills individually in homework assignments, assigned group problem-solving activities, and group quizzes or project assignments.
  2. Students develop their critical-thinking skills specifically in the unit on problem solving as well as in application problems throughout the course.
- II. This course addresses the general education outcome related to use of mathematical concepts to interpret, understand, and communicate quantitative data as follows:
  1. Students understand and use the major concepts of numbers and operations in mathematics for grades P-5.
  2. Students solve problems using multiple strategies, manipulatives, and technological tools; interpret solutions; and determine the reasonableness of answers and efficiency of methods.
  3. Students communicate using precise mathematical terminology
  4. Students construct and justify arguments as well as interpret solutions; and determine the reasonableness of answers and efficiency of methods

5. Students learn and apply problem-solving skills in each unit, especially in applications of decimals, fractions, and percents.

#### COURSE CONTENT

- A. Problem Solving
  - 1. Introduction to Problem Solving
  - 2. Patterns and Problem Solving
  - 3. Technology in Problem Solving
  
- B. Sets, Functions, and Reasoning
  - 1. Sets, Operations and Counting (Natural & Whole)
  - 2. Order Relationships
  - 3. Functions and Graphs
  - 4. Introduction to Deductive, Inductive, and Proportional Reasoning
  
- C. Whole Numbers
  - 1. Estimation, Approximation, & Computation
  - 2. Place Value & Other Bases
  - 3. Numeration Systems
  - 4. Addition and Subtraction
  - 5. Multiplication & Exponents
  - 6. Division
  
- D. Number Theory
  - 1. Prime & Composite
  - 2. Factors and Multiples
  - 3. Even & Odd
  - 4. Divisibility Rules
  - 5. Greatest Common Factor and Least Common Multiple
  
- E. Integers and Fractions
  - 1. Integers
  - 2. Introduction to Fractions
  - 3. Operations with Fractions
  
- F. Decimals: Rational and Irrational Numbers
  - 1. Decimals and Rational Numbers
  - 2. Operations with Decimals
  - 3. Ratio, Percent, and Scientific Notation
  - 4. Irrational and Real Numbers
  
- G. Statistics (**optional**)
  - 1. Describing and Analyzing Data
  - 2. Graphing Data and Making Predictions
  
- H. Measurement (**optional**)
  - 1. Systems of Measurement
  - 2. Area and Perimeter
  - 3. Volume and Surface Area

## ASSESSMENT OF EXPECTED EDUCATIONAL RESULTS

### A. COURSE GRADE

The course grade will be determined by the individual instructor using a variety of evaluation methods. A portion of the course grade will be determined through the use of frequent assessment using such means as tests, quizzes, projects, or homework as developed by the instructor. Some of these methods will require the student to demonstrate ability in problem solving and critical thinking as evidenced by explaining and interpreting solutions. A comprehensive final examination is required which must count at least one-fifth and no more than one-third of the course grade.

### B. DEPARTMENTAL ASSESSMENT

This course will be regularly assessed in accordance with the GPC policies. An appropriate assessment instrument will be determined by the Math 2008 course committee.

### C. USE OF ASSESSMENT FINDINGS

The Math 2008 committee, or a special assessment committee appointed by the Academic Group, will analyze the results of the assessment and determine implications for curriculum changes. The committee will prepare a report for the Academic Group summarizing its finding.

APPROVED DATE: May, 2007

EFFECTIVE DATE: August, 2007

REVIEWED BY COMMITTEE: January, 2009