

# MATH 42: MATH FOR ELEMENTARY SCHOOL TEACHERS

## Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2022
Units:	5
Hours:	5 lecture per week (60 total per quarter)
Prerequisite:	Intermediate Algebra or equivalent.
Advisory:	Demonstrated proficiency in English by placement via multiple measures OR through an equivalent placement process OR completion of ESLL 125 & ESLL 249.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU/UC
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

## Student Learning Outcomes

- After instruction, the student will be able to discuss the effects of math anxiety on the learning environment in an elementary classroom
- After instruction, the student will be able to identify and demonstrate important properties of arithmetic operations.
- After instruction, the student will be able to describe the mathematical structure of the integers, the rational numbers, and the real numbers.
- After instruction, the student will be able to design and develop pedagogical strategies to help elementary students learn arithmetic.

## Description

Focuses on the development of quantitative reasoning skills through in-depth, integrated explorations of topics in mathematics, including real numbers systems and subsystems. Emphasis is on comprehension and analysis of mathematical concepts and applications of logical reasoning.

## Course Objectives

The student will be able to:

- Perform calculations with place value systems; evaluate the equivalence of numeric algorithms and explain the advantages and disadvantages of equivalent algorithms in different circumstances
- Apply algorithms from number theory to determine divisibility in a variety of settings; analyze least common multiples and greatest common divisors and their role in standard algorithms
- Explain the concept of rational numbers, using both ratio and decimal representations; analyze the arithmetic algorithms for these two representations; and justify their equivalence
- Analyze the structure and properties of whole, rational, and real number systems; define the concept of rational and irrational

- numbers, including their decimal representation; and illustrate the use of a number line representation
- Develop and reinforce conceptual understanding of mathematical topics through the use of patterns, problem solving, communication, connections, modeling, reasoning, and representation
- Develop activities implementing curriculum standards

## Course Content

- Numeration systems
  - History
  - Hindu-Arabic numeration system
- Place value systems
- Integers
  - Structure
  - Basic properties
  - Computational algorithms
- Basic number theory
  - Divisibility
  - Prime and composite numbers
- Prime factorization
- Fundamental theorem of arithmetic
  - Least common multiple
  - Greatest common divisor
- Rational numbers
  - Structure
  - Properties
  - Ratio and proportion
- Real numbers
  - Structure
  - Basic properties
  - Arithmetic operations
  - Rational and irrational numbers
  - Decimal representation
  - Number line representation
- Conceptual mathematics
  - Numerical pattern recognition and description
  - Mathematical representation and modeling
  - Reasoning, making connections, and problem solving
  - Communicating results in accurate mathematical language
- Curriculum standards for elementary school math
  - National
  - California
  - Common Core Standards

## Lab Content

Not applicable.

## Special Facilities and/or Equipment

Access to graphing technology, such as a graphing calculator or graphing software.

## Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Tests, examinations, homework or projects where students demonstrate their mastery of the learning objectives and their ability to devise, organize and present complete solutions to problems

## Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture  
Discussion  
Collaborative learning exercises

## Representative Text(s) and Other Materials

Libeskind, Shlomo, Rick Billstein, and Johnny W. Lott. [A Problem Solving Approach to Mathematics for Elementary School Teachers, 13th ed.](#) (ISBN: 013518388X). 2020.

Beckmann, Sybilla. [Mathematics for Elementary Teachers with Activity Manual](#) (ISBN: 0134392795). 2017.

## Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- a. Completing homework problems each week covering subject matter from text.
- b. Reading textbook and other materials.
- c. Reviewing lecture notes.
- d. Completing a project related to subject matter that requires mathematical discussion, solutions written in accurate mathematical language and notation, and interpretation of mathematical results.
- e. Extended assessment activities and other nontrivial problems requiring extended responses that are not possible to complete in class. Such activities typically demand that students think critically about the prompts, assimilate knowledge gained in the course, and perhaps apply it in novel situations.

## Discipline(s)

Mathematics