

MATH C104: MATHEMATICS FOR ELEMENTARY TEACHERS

Item	Value
Top Code	170100 - Mathematics, General
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)
Local General Education (GE)	<ul style="list-style-type: none"> Area 2 Mathematical Concepts and Quantitative Reasoning (CA3)
California State University General Education Breadth (CSU GE-Breadth)	<ul style="list-style-type: none"> CSU B4 Math/Quant.Reasoning (B4)

Course Description

This course will develop and reinforce conceptual understanding of mathematical topics through the use of connections, modeling, and representation and national and state curriculum standards for elementary school math, including Common Core State Standards. Instructional delivery design techniques and technological applications will be explored. The course involves using technology, participating in group work and projects, and observing and/or teaching in local elementary schools. Topics covered include whole numbers, integers, rational numbers, real numbers, number theory, ratio, proportion, percent, set theory, and elementary logic. PREREQUISITE: A course taught at the level of intermediate algebra or appropriate math placement. Transfer Credit: CSU; UC: Credit Limitation: MATH C104 and MATH C106 combined: maximum credit, 1 course. C-ID: MATH 120.C-ID: MATH 120.

Course Level Student Learning Outcome(s)

1. Demonstrate conceptual understanding of mathematical topics through the use of connections, modeling, and representations in verbal and written explanation.
2. Apply mathematical thinking and modeling to solve application problems.
3. Use technology appropriately to enhance mathematical thinking to solve mathematical problems and to judge the reasonableness of the results.
4. Apply national and state curriculum standards for elementary school math, including Common Core State Standards.

Course Objectives

- 1. Perform calculations with place value systems;
- 2. Evaluate the equivalence of numeric algorithms and explain the advantages and disadvantages of equivalent algorithms in different circumstances;
- 3. Apply algorithms from number theory to determine divisibility in a variety of settings;

- 4. Analyze least common multiples and greatest common divisors and their role in standard algorithms;
- 5. Explain the concept of rational numbers, using both ratio and decimal representations; analyze the arithmetic algorithms for these two representations; and justify their equivalence;
- 6. 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;
- 7. Develop and reinforce conceptual understanding of mathematical topics through the use of patterns, problem solving, communication, connections, modeling, reasoning, and representation; and
- 8. Develop activities implementing curriculum standards.

Lecture Content

THINKING CRITICALLY Introduction to Problem Solving P Iya's Problem-Solving Principles and the Standards for Mathematical Practice of the Common Core State Standards for Mathematics Pattern Exploration Problem-Solving Strategies Reasoning Mathematically SETS AND WHOLE NUMBERS Set Operations, Venn Diagrams, DeMorgan's Laws, True Tables, Equivalent Statements, Deductive Reasoning, Contradictions, Conditional Statements Sets, Counting, Relations and Functions, and the Whole Numbers Addition and Subtraction of Whole Numbers Multiplication and Division of Whole Numbers Structure and Properties of Whole Number System NUMERATION AND COMPUTATION Numeration Systems Past and Present Nondecimal Positional Systems Algorithms for Adding and Subtracting Whole Numbers Algorithms for Multiplication and Division of Whole Numbers Mental Arithmetic and Estimation Analyze least common multiples and greatest common divisors role in standard algorithms NUMBER THEORY Divisibility of Natural Numbers Tests for Divisibility Prime and Composite Numbers, Prime Factorization, and Fundamental Theorem of Arithmetic Greatest Common Divisors and Least Common Multiples Connections to Number Theory Define the concept of irrational numbers, including their decimal representation Illustrate the use of a number line representation INTEGERS Representation of Integers. Addition and Subtraction of Integers Multiplication and Division of Integers Basic Properties and Computational Algorithms FRACTIONS, RATIONAL NUMBERS and PROPORTIONAL REASONING The Basic Concepts of Fractions and Rational Numbers The Arithmetic of Rational Numbers. The Rational Number System: Structures and Properties Proportional Reasoning, Ratio and Proportion DECIMALS AND REAL NUMBERS Introduction to Rational and Decimal Representation Computations with Decimals Structure and Properties of Real Number System Decimal and Ratio Presentations, Algorithms, and Equivalence Percent ACTIVITIES IMPLEMENTED WITH CURRICULUM STANDARDS Observation of Elementary School Classroom Prepare and Deliver an Instructional lesson to Elementary School Students Class Project and Presentation

Method(s) of Instruction

- Lecture (02)
- DE Online Lecture (02X)

Reading Assignments

- Problem Solving Exercises - Skills Demonstration - Quizzes

Writing Assignments

Observe real-world problems and translate into mathematical language.

Out-of-class Assignments

- Homework - Written Assignments - Projects

Demonstration of Critical Thinking

Written Assignments include a variety of problems to reinforce the understanding and achievement of all SLOs.

Required Writing, Problem Solving, Skills Demonstration

Quizzes will be multiple-choice or free-response; content will be from a recent lecture, reading assignment, or homework assignment. Midterm Examination will be free-response, open-ended, show your work for partial credit; content will be the first half of the course. Objective Examination may be separate assessment or part of an exam, could cover any of the SLOS. Written or oral report presented to class or instructor based on material in the course (optional). Individual or group projects based on material in the course presented written or verbally to instructor or the rest of the class (optional). Mathematical and Problem-Solving Exercises are included as homework assignments, part of classroom lectures and discussions, part of quizzes, Midterm Examination, Final Examination, and Projects (optional). Students will be able to explain solutions and justify reasoning verbally or in writing and may be included in classroom discussions, quizzes, Midterm Examination, Final Examination, and Projects (optional). Final examination will be free-response, open-ended, show your work for partial credit; content will be the entire course. Instructor may include points for class participation, journals, etc.

Eligible Disciplines

Mathematics: Master's degree in mathematics or applied mathematics OR bachelor's degree in either of the above AND master's degree in statistics, physics, or mathematics education OR the equivalent. Master's degree required.

Textbooks Resources

1. Required Long, Calvin T.; DeTemple, Duane W.; Millman, Richard S. Mathematical Reasoning for Elementary School Teachers, 7th ed. Pearson, 2019 Rationale: -

Other Resources

1. Coastline Library