COURSE OUTLINE OF RECORD

Number: MATH G104  TITLE: Mathematics For Elementary Teachers

ORIGINATOR: Pete Bouzar  EFF TERM: Fall 2018
FORMERLY KNOWN AS: Mathematics for Elementary Teachers  DATE OF OUTLINE/REVIEW: 03-20-2018
CROSS LISTED COURSE: TOP NO: 1701.00

SEMMESTER UNITS: 3.0
HRS LEC: 54.0  HRS LAB: 18.0  HRS OTHER: 0.0
CONTACT HRS TOTAL: 72.0
STUDY NON-CONTACT HRS RECOMMENDED: 108.0

CATALOG DESCRIPTION:
Topics include problem solving skills, structure and arithmetic of the real number system, other numeration systems, set theory, and manipulatives. This course is designed for students planning to be elementary teachers. Student should complete Mathematics G020 (high school geometry) before taking the CBEST test, or the second math course for elementary teachers at a four-year school. UC Credit Limitations: Math G103, G104 and G106 combined-maximum credit, one course.

JUSTIFICATION FOR COURSE:
State teachers licensing and/or certification

PREREQUISITES:
- GWC Math Placement Level of 50 or higher.
- MATH G030: Intermediate Algebra with a minimum grade of C or better
- OCC Math Placement Level of 50 or higher.
- MATH A030: Intermediate Algebra with a minimum grade of C or better
- CCC Math Placement Level of 60 or higher.
- MATH C030: Intermediate Algebra with a minimum grade of C or better
- MATH G040: Accelerated Elementary and Intermediate Algebra with a minimum grade of C or better
- MATH G080: Pre-Statistics with a minimum grade of C or better

COREQUISITES:

ADVISORIES:

ASSIGNED DISCIPLINES:
Mathematics

MATERIAL FEE: Yes [ ] No [X] Amount: $0.00
CREDIT STATUS: Noncredit [ ] Credit - Degree Applicable [X] Credit - Not Degree Applicable [ ]
GRADING POLICY: Pass/No Pass [ ] Standard Letter [X] Not Graded [ ] Satisfactory Progress [ ]
OPEN ENTRY/OPEN EXIT: Yes [ ] No [X]
TRANSFER STATUS: CSU Transferable[ ] UC/CSU Transferable[X] Not Transferable[ ]
MATH G104 - Mathematics For Elementary Teachers

BASIC SKILLS STATUS: Yes [ ] No [X] LEVELS BELOW TRANSFER: Not Applicable
CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable
NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course
OCCUPATIONAL (SAM) CODE: E
REPEATABLE ACCORDING TO STATE GUIDELINES: No [X] Yes [ ] NUMBER REPEATS:
REQUIRED FOR DEGREE OR CERTIFICATE: No [ ] Yes [X]
Elementary Teacher Education (Associate in Arts for Transfer)
Elementary Teacher Education (Associate in Arts for Transfer)
Liberal Arts: Emphasis in Mathematics (Associate in Arts)
Liberal Arts: Emphasis in Science (Associate in Arts)
Liberal Studies for Elementary Education (Associate in Arts)

GE AND TRANSFER REQUIREMENTS MET:
CSU GE Area B: Scientific Inquiry and Quantitative Reasoning
   B4 - Mathematics/Quantitative Thinking

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. Solve simple linear equations and inequalities.
2. Apply elementary number theory to find prime numbers, factorization, divisors, and multiples.
3. Perform calculations with place value systems.

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
8. Develop activities and use of manipulative in implementing curriculum standards

COURSE CONTENT:

LECTURE CONTENT:

1. An Introduction to problem solving
   A. Explorations with patterns
   B. Mathematics and problem solving
   C. Algebraic thinking
   D. Logic: An Introduction. Develop and reinforce conceptual understanding of mathematical topics through the use of communication, connections, modeling, and representation

2. 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. Relations and Functions

3. Numeration systems and whole-number computation
   A. Numeration systems: History, Hindu-Arabic numeration system, and place value 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

4. Integers and operations of addition and subtraction
   A. Integers and the operations of addition and subtraction: structure and basic properties; prime
      factorization, fundamental theorem of arithmetic
   B. Multiplication and division of integers
   C. Divisibility tests
   D. Prime and composite numbers
   E. Greatest common divisor and least common multiple
   F. Clock and modular arithmetic

5. Rational numbers and fractions
   A. The set of rational numbers: structure and properties; number line representation of real numbers
   B. Addition and subtraction of rational numbers
   C. Multiplication and division of rational numbers
   D. Proportional reasoning

6. Decimals, percents, and real numbers
   A. Introduction to decimals
   B. Operations on decimals
   C. Nonterminating decimals
   D. Percents
   E. Computing interest**
   F. Real numbers

7. Patterns, problem solving, communication, connections, modeling, reasoning, and representation
   A. Solving linear equations
   B. Solving inequalities
   C. Use of manipulatives
   D. Verbalize conclusions arising from the recognition and exploration of mathematical patterns.

LABORATORY CONTENT:
7. The laboratory component of this course consists of mathematical activities which provide hands-on
   manipulative based, problem solving experiences used to develop understanding of the concepts and
   skills listed above.

METHODS OF INSTRUCTION:
A. Lecture:
B. Lab:
C. Tutoring – noncredit:
D. Direct Study/IS:
E. Dist. Ed – Delayed Interaction:
F. Video One Way – Audio Two Way:
G. Two-way interactive audio only:
H. Other simultaneous interactive:
   I. Audio – One Way:
   J. Other passive medium:
K. Online:
L. Independent Study:

INSTRUCTIONAL TECHNIQUES:

COURSE ASSIGNMENTS:

Reading Assignments

A. Required Reading such as:

Read each section in the text before and/or after the lectures on that section.

Out-of-class Assignments

1. Optional professional journal reading assignments.
2. Optional individual/group projects.

Writing Assignments

Written homework assigned for each problem set corresponding to the lecture.

METHODS OF STUDENT EVALUATION:

Midterm Exam
Final Exam
Short Quizzes
Written Assignments
Essay Examinations
Objective Examinations
Report
Projects (ind/group)
Problem Solving Exercises
Oral Presentations
Skills Demonstration

Demonstration of Critical Thinking:

Each homework set, quiz, exam, project, calculator and/or computer assignment requires critical thinking and problem solving using the components of the real number system.

Required Writing, Problem Solving, Skills Demonstration:

Written homework assigned for each problem set corresponding to the lecture.

TEXTS, READINGS, AND RESOURCES:

TextBooks:


LIBRARY:

Adequate library resources include:

Comments:

Attachments:

[Attached Files]