

Course Outline

COURSE: MATH 12 **DIVISION:** 10 **ALSO LISTED AS:**

TERM EFFECTIVE: Fall 2019 **CURRICULUM APPROVAL DATE:** 04/09/2019

SHORT TITLE: MATH FOR TEACHERS

LONG TITLE: Mathematics for Elementary Teachers

<u>Units</u>	<u>Number of Weeks</u>	<u>Type</u>	<u>Contact Hours/Week</u>	<u>Total Contact Hours</u>
3	18	Lecture:	3	54
		Lab:	0	0
		Other:	0	0
		Total:	3	54

COURSE DESCRIPTION:

This course is intended for students preparing for a career in elementary school teaching. Emphasis will be on the structure of the real number system, numeration systems, elementary number theory, and problem solving techniques. Technology will be integrated throughout the course. **PREREQUISITE:** High School Geometry and Math 240 (Algebra 2) or Math 242 (Algebra for Statistics) or skills equivalent to Intermediate Algebra. All courses must be completed with a grade of 'C' or better.

PREREQUISITES:

- Completion of MATH 233, as UG, with a grade of C or better.
- OR
- (Completion of MATH 233A, as UG, with a grade of C or better.
- AND Completion of MATH 233B, as UG, with a grade of C or better.)
- OR
- Completion of MATH 235, as UG, with a grade of C or better.
- OR
- Completion of MATH 240, as UG, with a grade of C or better.
- OR
- Completion of MATH 242, as UG, with a grade of C or better.
- OR
- Completion of MATH 6, as UG, with a grade of C or better.
- OR
- Completion of MATH 8A, as UG, with a grade of C or better.
- OR
- Completion of MATH 8B, as UG, with a grade of C or better.
- OR
- Completion of MATH 5, as UG, with a grade of C or better.

OR

Completion of MATH 14, as UG, with a grade of C or better.

OR

Completion of MATH 7, as UG, with a grade of C or better.

OR

Completion of MATH 1A, as UG, with a grade of C or better.

OR

Completion of MATH 1B, as UG, with a grade of C or better.

OR

Completion of MATH 1C, as UG, with a grade of C or better.

OR

Score of 33 on Intermediate Algebra

OR

Score of 13 on Pre-Calculus

OR

Score of 2700 on Accuplacer Math

OR

Score of 2600 on MM Placement Tool Math

COREQUISITES:

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES

L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

02 - Lecture and/or discussion

STUDENT LEARNING OUTCOMES:

1. Identify, describe, compare and contrast patterns, number relationships, prime numbers, composite numbers, and operation relationships of real numbers.

Measure of assessment: Homework and exam

Year assessed, or planned year of assessment: 2020

Semester: Fall

2. Identify, describe, compare and contrast algorithms to find estimates and exact answers to problems involving whole numbers, integers, and rational numbers.

Measure of assessment: Homework and exam

Year assessed, or planned year of assessment: 2020

Semester: Spring

3. Identify, describe, compare and contrast patterns and models of integer and arithmetic operations.

Measure of assessment: Homework, term papers, and exam

Year assessed, or planned year of assessment: 2020

Semester: Spring

4. Identify, describe, compare and contrast problem-solving methodologies involving whole numbers, integers, and rational numbers.

Measure of assessment: Homework, term papers, and exam

Year assessed, or planned year of assessment: 2020

Semester: Fall

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS

Curriculum Approval Date: 04/09/2019

WEEK 1-2 6 HOURS

CONTENT

Introduction. Problem solving and algorithms.

HOMEWORK

Reading and problems from text. Research

current journal articles that discuss

ways in which children employ problem solving techniques and various algorithms using

Common Core state and national standards. Students will develop classroom activities

implementing Common Core standards.

PERFORMANCE OBJECTIVES

Students will

describe, compare and contrast various problem solving techniques and algorithms

such as modeling, looking for a pattern, guessing and checking, and working backwards.

Students will explain the advantages and disadvantages of the various techniques and

create a classroom activity using one of the approaches.

WEEK 3-4 6 HOURS

CONTENT

Number sets and numeration systems.

HOMEWORK

Students will develop activities implementing Common Core standards.

Reading and problems from text.

PERFORMANCE OBJECTIVES

Students will describe, compare and contrast

the ways numbers are used

in the real world. Students will describe, compare and contrast

geometric, numeric, and verbal patterns in the Hindu-Arabic and other numeration

systems. Students will develop projects emphasizing numerical connections and numerical reasoning.

WEEK 5-6 6 HOURS

CONTENT

Whole number operations and properties.

HOMEWORK

Reading and problems from text. Research informal thinking strategies

used by children to master basic number facts.

PERFORMANCE OBJECTIVES

Students will identify, set-up, and solve one-step problems. Students

will identify, compare and contrast informal

thinking strategies

employed by children, and describe the ways arithmetic operations are connected.

Students will work with the basic properties.

WEEK 7-8 6 HOURS

CONTENT

Estimation and computation.

HOMEWORK

Reading and problems from text.

Students will develop activities implementing Common Core state and national standards.

PERFORMANCE OBJECTIVES

Student will explain, compare and contrast estimation techniques and mental computational techniques. Students will work with the order of operations and properties of equality.

WEEK 9-10 6 HOURS

CONTENT

Number theory.

HOMEWORK

Reading and problems from text.

PERFORMANCE OBJECTIVES

Students will identify prime and composite numbers. Students will

describe and perform prime factorizations of composite numbers using divisibility tests. Students will work with the Fundamental Theorem of Arithmetic.

WEEK 11-14 12 HOURS

CONTENT

Real numbers, integers, decimals, and fractions

HOMEWORK

Reading and problems from text. Design and construct a manipulative to explain integer operations.

PERFORMANCE OBJECTIVES

Students will explain the structure and basic concepts of the whole, rational, and real number systems.

Students will construct number line representations. Students will identify,

describe, compare and contrast opposites, negative and positive

numbers, decimals, fractions, and the rules for adding, subtracting, multiplying, and dividing numbers.

WEEK 15-16 6 HOURS

CONTENT

Rational numbers and their decimal representations and irrational numbers.

HOMEWORK

Reading and problems from text.

Students will develop activities implementing Common Core state and national standards.

PERFORMANCE OBJECTIVES

Students will identify, describe, compare and contrast fractions and whole numbers on the number line. Students

will identify, describe, and work with greatest common divisors, least common multiples, and

equivalent fractions. Students will be able to identify, set-up, and

solve problems with fractions, ratios and proportions.

WEEK 17 3 HOURS

Presentation of research papers on topics emphasizing modeling, connections, reasoning, and representation.

Develop and present a classroom activity to go with the topic of the paper which aligns with Common Core standards.

WEEK 18 2 HOURS

Final Exam.

METHODS OF INSTRUCTION:

Lecture, designing lessons, projects and papers, small group work.

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours: 108

Assignment Description: Homework, group work, and partner work.

METHODS OF EVALUATION:

Writing assignments

Percent of total grade: 20.00 %

20% - 30% Written homework; Term papers

Problem-solving assignments

Percent of total grade: 20.00 %

20% - 30% Homework problems; Exams

Skill demonstrations

Percent of total grade: 20.00 %

20% - 30% Class performance

Objective examinations

Percent of total grade: 20.00 %

20% - 30% Multiple choice; True/false; Matching items; Completion; Other: Short answer essay

REPRESENTATIVE TEXTBOOKS:

Required Representative Textbooks

Sybilla Beckmann. Mathematics for Teachers, 5th edition or other appropriate college level text.. Boston: Pearson,2017.

ISBN: 9-78-0321-825728

Reading Level of Text, Grade: 12 Verified by: Microsoft Word

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

GAV B4, effective 201970

CSU GE:

CSU B3, effective 201970

CSU B4, effective 201970

IGETC:

IGETC 2A, effective 201970

CSU TRANSFER:

Transferable CSU, effective 200570

UC TRANSFER:

Transferable UC, effective 200570

SUPPLEMENTAL DATA:

Basic Skills: N

Classification: Y

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

CAN:

CAN Sequence:

CSU Crosswalk Course Department: MATH

CSU Crosswalk Course Number: 12

Prior to College Level: Y

Non Credit Enhanced Funding: N

Funding Agency Code: Y

In-Service: N

Occupational Course: E

Maximum Hours:

Minimum Hours:

Course Control Number: CCC000127968

Sports/Physical Education Course: N

Taxonomy of Program: 170100