MATH M10: MATHEMATICS FOR ELEMENTARY TEACHERS

Originator
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Co-Contributor(s)

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College
Moorpark College

Discipline (CB01A)
MATH - Mathematics

Course Number (CB01B)
M10

Course Title (CB02)
Mathematics for Elementary Teachers

Banner/Short Title
Math for Elem Teachers

Credit Type
Credit

Start Term
Fall 2023

Catalog Course Description
Focuses on the development of quantitative reasoning skills through in-depth, integrated explorations of topics in mathematics, including real numbers systems and subsystems. Emphasizes the comprehension and analysis of mathematical concepts and applications of logical reasoning.
Designed for students intending to teach in K-8. Not recommended for majors in physical sciences or mathematics.

Taxonomy of Programs (TOP) Code (CB03)
1701.00 - Mathematics, General

Course Credit Status (CB04)
D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)
A (Transferable to both UC and CSU)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
E - Non-Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)
Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)
N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)
Y - Not Applicable

Course Noncredit Category (CB22)
Y - Credit Course

Funding Agency Category (CB23)
Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)
1 - Program Applicable

General Education Status (CB25)
B - Satisfies Math/Quantitative Reasoning req (CSUGE-B B4, IGETC 2, or 4-yr)

Support Course Status (CB26)
N - Course is not a support course

Field trips
Will not be required

Grading method
(L) Letter Graded

Alternate grading methods
(O) Student Option- Letter/Pass
(P) Pass/No Pass Grading

Does this course require an instructional materials fee?
No

Repeatable for Credit
No

Is this course part of a family?
No

Units and Hours

Carnegie Unit Override
No

In-Class

Lecture
Minimum Contact/In-Class Lecture Hours
52.5
Maximum Contact/In-Class Lecture Hours
52.5

Activity
Minimum Contact/In-Class Activity Hours
0
Maximum Contact/In-Class Activity Hours
0

Laboratory
Minimum Contact/In-Class Laboratory Hours
0
Maximum Contact/In-Class Laboratory Hours
0

Total in-Class

Total in-Class
Total Minimum Contact/In-Class Hours
52.5
Total Maximum Contact/In-Class Hours
52.5

Outside-of-Class

Internship/Cooperative Work Experience

Paid
Minimum Paid Internship/Cooperative Work Experience Hours
0
Maximum Paid Internship/Cooperative Work Experience Hours
0

Unpaid
Minimum Unpaid Internship/Cooperative Work Experience Hours
0
Maximum Unpaid Internship/Cooperative Work Experience Hours
0

Total Outside-of-Class

Total Outside-of-Class
Minimum Outside-of-Class Hours
105
Maximum Outside-of-Class Hours
105

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
157.5
Total Maximum Student Learning Hours
157.5

Minimum Units (CB07)
3
Maximum Units (CB06)
3

Prerequisites
Intermediate Algebra or placement as determined by the college's multiple measures assessment process.

Entrance Skills

Entrance Skills
- analyze and solve various equations, inequalities, and systems of equations.

- graph and interpret linear and quadratic functions.

Requisite Justification

Requisite Type
Prerequisite

Requisite
Intermediate Algebra

Requisite Description
Course not in a sequence

Level of Scrutiny/Justification
Required by 4 year institution

Student Learning Outcomes (CSLOs)

	Upon satisfactory completion of the course, students will be able to:
1	use mathematical language and notation appropriately and effectively to communicate ideas verbally and in writing.
2	demonstrate understanding of standard and non-standard algorithmic procedures for performing operations on subsets of real numbers.
3	analyze and solve application problems using the fundamental properties of real number operations and problem solving techniques.

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1	write numbers in Hindu-Arabic, Babylonian, Roman and other numeration systems.
2	convert numbers from base ten into place value systems in other bases and perform basic arithmetic operations in bases other than ten.
3	define addition and subtraction of integers and state the properties of addition and subtraction.
4	define multiplication and division of integers and state the properties of multiplication and division.
5	evaluate the equivalence of numeric algorithms and explain the advantages and disadvantages of equivalent algorithms in different circumstances.
6	apply algorithms from number theory to determine divisibility in a variety of settings.
7	define prime and composite numbers and factor a composite into primes.
8	determine the greatest common divisors and least common multiples of sets of numbers and explain their role in standard algorithms.
9	define the set of rational numbers using both ratio and decimal representations; analyze the arithmetic algorithms for these two representations and justify their equivalence.
10	define the set of real numbers and state the properties of real numbers.
11	analyze the structure and properties of whole, rational, and real number systems; define rational and irrational numbers, including their decimal representation and illustrate the use of a number line representation.
12	define rates, ratios and proportions and use ratios and proportions to solve real life problems.
13	define percentages and use percents to solve problems.
14	use patterns, problem solving, communication, connections, modeling, reasoning, and representation to reinforce conceptual understanding of mathematical topics.
15	develop activities implementing national, state and Common Core curriculum standards.

Course Content

Lecture/Course Content

20% A. Numeration Systems

1. The history of numeration systems

2. Hindu-Arabic numeration system
3. Place value systems
4. Basic arithmetic in other bases

10% B. Problem Solving
1. Patterns and connections
2. Mathematical reasoning
3. Communication of mathematical concepts
4. Modeling and representation

5% C. Curriculum Standards for Elementary School Mathematics
1. National curriculum standards
2. State curriculum standards
3. Common Core state standards

10% D. Proportional Reasoning
1. Rates and ratios
2. Using proportions
3. Using percents

15% E. Real Numbers
1. The set of real numbers
2. Properties of real numbers
3. Rational and irrational numbers
4. Arithmetic operations, decimal representation, and number line representation

20% F. Rational Numbers
1. The set of rational numbers and its properties
2. Addition and subtraction of rational numbers
3. Multiplication and division of rational numbers

20% G. Integers and Number Theory
1. Basic properties of integers and computational algorithms
2. Divisibility
3. Prime and composite numbers
4. Prime factorization
5. Greatest common divisor and least common multiple
6. The fundamental theorem of arithmetic

Laboratory or Activity Content

Not applicable

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Written expression
Problem solving exercises
Skills demonstrations

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Computational homework
Group projects
Individual projects
Objective exams
Problem-solving exams
Problem-solving homework
Quizzes
Other (specify)
Classroom Discussion
Projects

Other

Quizzes and graded work will be used to evaluate students for the critical thinking skills needed to solve math problems. Problems must require students to demonstrate analytic skills and the step-by-step details required for the solution.

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Audio-visual presentations

Class activities
Class discussions
Collaborative group work
Demonstrations
Distance Education
Group discussions
Instructor-guided interpretation and analysis
Instructor-guided use of technology
Lecture
Problem-solving examples
Small group activities
Other (specify)

Specify other method of instruction

All instructors will use best practices to provide an inclusive learning environment that respects all forms of racial, ethnic, age, and gender diversity, and provides for the individual needs of students of all learning styles.

Describe specific examples of the methods the instructor will use:

1. Use of whiteboard or document camera to demonstrate solutions to calculations, such as identifying patterns in different base systems for basic computations of multiplication and addition.
2. Classroom discussion, with student response, such as discussing the National curriculum, State curriculum, and Common Core state standards.
3. In-class group activities, such as guided practice on solving application problems using various algorithms of the real number system.

Representative Course Assignments

Writing Assignments

1. Complete homework problems selected from the math for elementary teachers textbook where answers require a written explanation of the solution, such as find the greatest common factor and least common multiple of sets of numbers.
2. Write solutions to short answer problems on exams, such as stating the solution of a ratio and proportion problem.
3. Complete graded assignments: in-class and/or homework assignments requiring complete solutions using both written English and symbolic mathematical language, such as solving an application problem using Polya's Four Step Strategy.

Critical Thinking Assignments

1. Describe and apply the algorithmic steps for obtaining the solution to a mathematical problem, such as applying the divisibility criteria to integers.
2. Compare and contrast methods of solution to mathematical problems, such as using different algorithms for multiplication and division of whole numbers.
3. Apply analytic techniques for solving mathematical and application problems, such as ratio and proportion problems.

Reading Assignments

1. Reading chapters from the textbook on problem solving techniques for visualizing the context of application problems related to basic arithmetic.
2. Reading an article on problem solving techniques as it relates to the Common Core state standards.
3. Reading resource materials from the library or online concerning real-life applications using percents and proportions.

Skills Demonstrations

1. Demonstration of computational skills such as converting numerals from base ten to other bases, such as base five or base twelve or another civilization such as the Mayan base system. Show how to convert these numerals back to base ten.
2. Demonstration of understanding of how to solve problems using the operations of the Real Numbers including decimals, integers and fractions.

Problem-Solving and Other Assignments (if applicable)

1. Demonstration of the different types of algorithms used for arithmetic and algebraic problem solving.
2. Completion of graded problem solving assignments, such as applying divisibility algorithms to counting numbers.

Outside Assignments

Representative Outside Assignments

1. Complete group or individual projects, such as students participating in a card game activity to understand the ordering of fractions.
2. Complete additional problem sets provided by the instructor, such as practice converting numbers from base ten to other bases.
3. Complete assigned reading material and homework problems from the math for elementary teachers textbook, such as solving problems using Venn diagrams.

Articulation

C-ID Descriptor Number

MATH 120

Status

Approved

Equivalent Courses at 4 year institutions

University	Course ID	Course Title	Units
Cal Poly SLO	MATH 227	Mathematics for Elementary Teaching I	4
CSU Channel Islands	MATH 208	Modern Mathematics for Elementary Teaching I – Numbers and Problem Solving	3
Cal Poly Pomona	MAT 1940	Mathematical Concepts for Elementary School Teachers	4

Comparable Courses within the VCCCD

MATH R102 - Mathematics for Elementary School Teachers
MATH V38 - Mathematics for Elementary School Teachers

Equivalent Courses at other CCCs

College	Course ID	Course Title	Units
Foothill College	MATH 42	Math for Elementary School Teachers	5
Coastline Community College	MATH C104	Mathematics for Elementary Teachers	3
Santa Monica College	MATH 41	Mathematics for Elementary School Teachers	3

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

D2. Communication/Analytical Thinking

Approved

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

Course is CSU transferable

Yes

CSU Baccalaureate List effective term:

Fall 1995

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

B4 Mathematical/Quantitative Reasoning
Approved

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

UC TCA

UC TCA
Approved

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type
Textbook

Classic Textbook
No

Description
Bassarear, Tom, and Meg Moss. *Mathematics for Elementary School Teachers.* 7th ed., Cengage, 2020.

Resource Type
Textbook

Classic Textbook
No

Description
Bennett, Albert, et al. *Mathematics for Elementary Teachers: A Conceptual Approach*. 10th ed., McGraw-Hill, 2016.

Resource Type
Textbook

Classic Textbook
No

Description
Beckmann, Sybilla. *Mathematics for Elementary and Middle School Teachers with Activities*. 6th ed., Pearson, 2022.

Resource Type
Textbook

Classic Textbook
No

Description
Billstein, Rick, et al. *A Problem Solving Approach to Mathematics for Elementary School Teachers.* 13th ed., Pearson, 2020.

Resource Type
Textbook

Description
Manes, Michelle. *Mathematics for Elementary Teachers.* E-book, Open Textbook Library (University of Hawaii Manoa), 2017, https://open.umn.edu/opentextbooks/textbooks/mathematics-for-elementary-teachers. Accessed 30 Sept 2022.

Library Resources

Assignments requiring library resources
Research papers and projects, using as sources material from the Library's print and online resources, on topics related to the teaching of mathematics to elementary school students, such as researching polygons and three-dimensional figures to write a report and present to the class.

Sufficient Library Resources exist
Yes

Example of Assignments Requiring Library Resources
Research different methods of teaching pedagogy appropriate for varying levels of children in primary and secondary students.

Distance Education Addendum

Definitions

Distance Education Modalities
Hybrid (1%–50% online)
Hybrid (51%–99% online)
100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.
Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

Regular Effective/Substantive Contact

Hybrid (1%—50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Use of student discussion boards to discuss concepts from the material, solutions to homework problems, general discussion of techniques in solving problems, study skills, or arranging study groups.
E-mail	Responding to student queries about material, grade information, course policies and procedures, scheduling and due dates, submitting homework assignments, or making general announcements to the class.
Face to Face (by student request; cannot be required)	Students requesting to speak to instructor in person for personal help on material, grade information, or discussion of policies and procedures.
Synchronous Dialog (e.g., online chat)	Active live discussion with the instructor on material concepts, techniques for problem solving, feedback on solutions to problems, general chat on study skills, or answers to homework problems, quizzes or tests.
Other DE (e.g., recorded lectures)	Posting of recorded lectures either by the instructor, recorded lessons available through campus resources, or use of public online resources available on the internet.

Hybrid (51%—99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Use of student discussion boards to discuss concepts from the material, solutions to homework problems, general discussion of techniques in solving problems, study skills, or arranging study groups.
E-mail	Responding to student queries about material, grade information, course policies and procedures, scheduling and due dates, submitting homework assignments, or making general announcements to the class.
Face to Face (by student request; cannot be required)	Students requesting to speak to instructor in person for personal help on material, grade information, or discussion of policies and procedures.
Synchronous Dialog (e.g., online chat)	Active live discussion with the instructor on material concepts, techniques for problem solving, feedback on solutions to problems, general chat on study skills, or answers to homework problems, quizzes or tests.
Other DE (e.g., recorded lectures)	Posting of recorded lectures either by the instructor, recorded lessons available through campus resources, or use of public online resources available on the internet.

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Use of student discussion boards to discuss concepts from the material, solutions to homework problems, general discussion of techniques in solving problems, study skills, or arranging study groups.
E-mail	Responding to student queries about material, grade information, course policies and procedures, scheduling and due dates, submitting homework assignments, or making general announcements to the class.
Synchronous Dialog (e.g., online chat)	Active live discussion with the instructor on material concepts, techniques for problem solving, feedback on solutions to problems, general chat on study skills, or answers to homework problems, quizzes or tests.

Other DE (e.g., recorded lectures)	Posting of recorded lectures either by the instructor, recorded lessons available through campus resources, or use of public online resources available on the internet.

Examinations

Hybrid (1%–50% online) Modality
On campus

Hybrid (51%–99% online) Modality
On campus

Primary Minimum Qualification
MATHEMATICS

Review and Approval Dates

Department Chair
10/14/2022

Dean
10/17/2022

Technical Review
10/20/2022

Curriculum Committee
11/01/2022

DTRW-I
MM/DD/YYYY

Curriculum Committee
MM/DD/YYYY

Board
MM/DD/YYYY

CCCCO
MM/DD/YYYY

Control Number
CCC000427957

DOE/accreditation approval date
MM/DD/YYYY