MATH 74 Course Outline as of Fall 2023

CATALOG INFORMATION

Dept and Nbr: MATH 74   Title: NUMBER SYSTEMS
Full Title: Mathematics for Elementary School Teachers - Number Systems
Last Reviewed: 1/9/2024

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	4.00	17.5	Lecture Scheduled	70.00
Minimum	4.00	Lab Scheduled	0	6.5	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 140.00   Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable
Grading: Grade Only
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:

Students will learn mathematical concepts needed for teaching elementary school mathematics including quantitative reasoning, number systems and subsystems, basic number theory, logical thinking, and applications. Content is relevant to national curriculum standards and Common Core State Standards.

Prerequisites/Corequisites:

Completion of MATH 161 or MATH 154 or MATH 156 or AB705 placement into Math Tier 2 or higher

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:

Description: Students will learn mathematical concepts needed for teaching elementary school mathematics including quantitative reasoning, number systems and subsystems, basic number theory, logical thinking, and applications. Content is relevant to national curriculum standards

and Common Core State Standards. (Grade Only)
Prerequisites/Corequisites: Completion of MATH 161 or MATH 154 or MATH 156 or AB705 placement into Math Tier 2 or higher
Recommended:
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area		Effective:	Inactive:
	B	Communication and Analytical Thinking	Fall 2023	
	MC	Math Competency		
CSU GE:	Transfer Area		Effective:	Inactive:
IGETC:	Transfer Area		Effective:	Inactive:
CSU Transfer:	Transferable	Effective: Fall 2023	Inactive:	
UC Transfer:		Effective:	Inactive:	

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Analyze the structure and properties of different number systems including real numbers and their subsystems.
2. Use basic number theory including divisibility tests, prime and composite numbers, and the Fundamental Theorem of Arithmetic.
3. Develop and reinforce conceptual understanding of mathematical topics through the use of patterns, problem solving, communication, connections, modeling, reasoning, and representation.
4. Explain national and state standards for elementary school curriculum, including Common Core.

Objectives:
At the conclusion of this course, the student should be able to:
1. Perform calculations with place value systems including base ten and other natural number bases.
2. Apply algorithms from number theory to determine divisibility in a variety of circumstances.
3. Explain and use the Fundamental Theorem of Arithmetic.
4. Explain the concept of rational numbers using both ratio and decimal representations.
5. Describe the arithmetic algorithms for operations on rational numbers.
6. Describe the structure and properties of integers, rational numbers, and real numbers.
7. Develop, model, and solve problems using reasoning, logic, and pattern recognition.

8. Develop activities implementing curriculum standards.

Topics and Scope:

I. Numeration Systems
   A. Historical
   B. Hindu-Arabic
   C. Place-Value
      1. Base 10
      2. Other bases
II. Basic Number Theory
   A. Divisibility
   B. Prime and composite numbers
   C. Prime factorization
   D. Fundamental Theorem of Arithmetic
   E. Least common multiple
   F. Greatest common divisor
III. Integers
   A. Structure
   B. Properties
   C. Computational algorithms
IV. Rational Numbers
   A. Structure
   B. Properties
   C. Computational algorithms
   D. Ratio and proportion
V. Real Numbers
   A. Structure
   B. Properties
   C. Irrational numbers
   D. Decimal representation
   E. Number line representation
VI. Conceptual Understanding
   A. Patterns
   B. Problem solving
   C. Reasoning
   D. Modeling
VII. National and State Standards
   A. Process standards
      1. Problem solving
      2. Reasoning
      3. Communication
      4. Representation
      5. Connection
   B. Mathematical proficiency
      1. Adaptive reasoning
      2. Strategic competence
      3. Conceptual understanding
      4. Procedural fluency
      5. Productive disposition

Assignment:

1. Reading outside of class (0-60 pages per week)
2. Problem set(s) (1-8 per week)
3. Quiz(zes) (0-4 per week)
4. Project(s) (0-10)
5. Exams (2-6)
6. Final exam

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Problem sets	Problem solving 5 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Quiz(zes); exams; final exam	Exams 70 - 95%

Other: Includes any assessment tools that do not logically fit into the above categories.

Project(s)	Other Category 0 - 20%

Representative Textbooks and Materials:
A Problem Solving Approach to Mathematics for Elementary School Teachers. 13th ed. Billstein, R., Libeskind, S., and Lott, J.W. Pearson. 2020.
Mathematical Reasoning for Elementary Teachers. 7th ed. Long, C., De Temple, D., and Millman R., Pearson. 2019.