Mathematics for Elementary Teachers I
MATH127
Fall 2025

This course provides a conceptually based, comprehensive study of the mathematical content of numbers and their operations at the deep level required for successful elementary school teaching. Topics are examined in ways that are meaningful to pre-service elementary teachers. Topics include: place value and arithmetic models, mental math, algorithms, pre-algebra factors and prime numbers, fractions and decimals, ratio, percentage and rates, integers, and elementary number theory.

COURSE OUTCOMES	OUTCOMES ACTIVITIES
At the end of this course, students will be able to	
Understanding the number system and the concept of place values:	1. Analyzing the structures and properties of the base-10 and other numeral systems, including numeration systems of ancient cultures. (CT,QS,R,TS) 2. Recognizing decimal expansions. (CT,QS,R,TS) 3. Using scientific notation in the real world. (CT,QS,R,TS) 4. Analyzing procedures (e.g., rounding, regrouping) for estimation. (CT,QS,TS) 5. Determining the reasonableness of estimates. (CT,QS,R,TS) 6. Identifying subsets of real numbers and their characteristics. (CT,QS,R,TS)
Understanding of integers, fractions, decimals, percents, and mixed numbers:	1. Understanding the meaning and models of integers, fractions, decimals, percents, and mixed numbers and applying them to the solution of word problems. (CT,QS,R,TS) 2. Analyzing and converting among various representations of numbers (e.g., graphic, numerical, symbolic, verbal). (CT,QS,TS) 3. Using number lines. (CT,QS,R,TS) 4. Comparing, sorting, ordering, and rounding numbers. (CT,QS,R,TS) 5. Recognizing equivalent representations of numbers (e.g., fractions, decimals, percents). (CT,QS,R,TS)
Understanding of principles of number theory:	1. Identifying prime and composite numbers and their characteristics. (CT,QS,R,TS) 2. Finding the prime factorization of a number and recognizing its uses. (CT,QS,R,TS) 3. Demonstrating knowledge of the divisibility rules and why they work. (CT,QS,R,TS) 4. Finding the least common multiple (LCM) and the greatest common factor (GCF) of a set of numbers. (CT,QS,R,TS) 5. Applying the LCM and GCF in real-world situations. (CT,QS,R,TS)

Understanding of operations of numbers:	1. Understanding the meaning and models of operations on real rational numbers. (CT,QS,R,TS) 2. Analyzing and justifying standard and nonstandard computational algorithms and mental math techniques (e.g., by application of the arithmetic properties, such as commutative, associative, distributive). (CT,QS,R,TS) 3. Evaluating the validity of nonstandard or unfamiliar computational strategies. (CT,QS,R,TS) 4. Recognizing and analyzing various representations (e.g., graphic, pictorial, verbal) of number operations. (CT,QS,R,TS) 5. Recognizing relationships among operations (e.g., addition and subtraction, addition and multiplication, multiplication and exponentiation). (CT,QS,R,TS) 6. Identifying and applying the arithmetic properties and the transitive properties of equality and inequality. (CT,QS,R,TS) 7. Applying the order of operations. (CT,QS,R,TS) 8. Applying the laws of exponents. (CT,QS,R,TS) 9. Demonstrating fluency in arithmetic computation, including operations with fractions. (CT,QS,R,TS) 10. Interpreting the concept of absolute value. (CT,QS,R,TS) 11. Applying appropriate strategies (e.g., proportional thinking, ratios) to estimate quantities in real-world situations. (CT,QS,R,TS) 12. Solving problems using arithmetic operations with various representations of numbers. (CT,QS,R,TS)

**Indicate the Core Competencies that apply to the outcomes activities and assessment tools: Critical Thinking (CT); Technology Skills (TS); Oral Communications (OC); Quantitative Skills (QS); Reading (R); Writing (W).