MTH130 STRUCTURE OF THE REAL NUMBER SYSTEM

I. CATALOG DESCRIPTION

Prerequisite(s): ASSET-Intermediate Algebra with score of 40 or ACT Math with score of 20 or MTH128 Intermediate Algebra with minimum grade of C

Or

COMPASS Algebra with score of 66 or COMPASS College Algebra with score of 31

Structure of the Real Number System presents topics from algebra within the context of the whole numbers, the integers, the rational numbers, and the real numbers. Students will study topics from algebra which are appropriate for elementary education majors. This course will meet the mathematics requirement for the Associate of Arts degree for elementary education majors only. (F, S, Su)

II. GENERAL COURSE OBJECTIVES

Upon completion of this course the student will be able to:

A. Complete a number sequence.

B. Write the rule for arithmetic number sequences.

C. Outline the necessary steps to solve a word problem.

D. Read and apply set notation.

E. Carry out set operations.

F. Use Venn diagrams and attribute pieces to solve set operations.

G. Perform operations on all types (wholes, integers, rationals, and decimals) of numbers.

H. Use models to explain operations on all types of numbers.

I. Make simple mental computations and estimates with all types of numbers.

J. Carry out number operations using a variety of algorithms

K. Recognize and correct common error patterns in operations on all types of numbers.
L. Make models showing place value.

M. Write a number in expanded form to show place value.

N. Carry out whole number operations in bases other than base ten.

O. Determine the prime factorization of a composite number and recognize prime numbers.

P. Know and carry out the divisibility tests for 2, 3, 4, 5, 6, 8, 9, 10.

Q. Find the greatest common factor and the least common multiple of a set of numbers.

R. Determine if two numbers are relatively prime.

S. Set up simple ratios.

T. Be able to change forms (fractions, decimals and percents).

U. Use proportions to solve percentage problems.

V. Solve simple and compound interest problems.

III. COURSE OUTLINE

A. Mathematical Reasoning

B. Sets and Functions

C. Whole Numbers

D. Number Theory

E. Integers

F. Rational Numbers as Fractions

G. Decimals, Percents, and Real Numbers

IV. UNIT OBJECTIVES

A. Mathematical Reasoning
   1. Inductive reasoning
   2. Deductive reasoning
   3. Inductive and deductive reasoning
4. Patterns
5. Problem solving
6. Problem solving strategies

B. Sets and Functions
1. Sets
2. Operations on two sets
3. Functions and relations

C. Whole Numbers
1. Numeration systems
2. Addition and subtraction of whole numbers
3. Multiplication and division of whole numbers
4. Properties of whole number operations
5. Algorithms for whole-number addition and subtraction
6. Algorithms for whole-number multiplication and division
7. Whole numbers: Mental computation and estimation
8. Place value and operations in other bases

D. Number Theory
1. Factor
2. Divisibility
3. Prime and composite numbers
4. Common factors and multiples

E. Integers
1. Addition and subtraction of integers
2. Multiplication and division of integers
3. Properties of integer operations

F. Rational Numbers as Fractions
1. Rational numbers
2. Addition and subtraction of rational numbers
3. Multiplication and division of rational numbers
4. Rational numbers: Properties, estimation, and error patterns

G. Decimals, Percents, and Real Numbers
1. Decimals: Place value, estimation, and mental computation
2. Decimal arithmetic and error patterns
3. Ratio and proportion
4. Percents
5. Percents: Mental computation, estimation, and change

V. METHOD OF INSTRUCTION

A. Lectures
B. Class Discussion

C. Reading Textbook

D. Current Articles

VI. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION


VII. REQUIRED MATERIALS (STUDENT)

Calculator

VIII. SUPPLEMENTAL REFERENCES

None

IX. METHOD OF EVALUATION (STUDENT)

A. Lecture Examinations

B. Required Homework
   1. Textbook Questions and Problems
   2. Article Summaries