Tennessee Technological University
Mathematics Department

MATH 1410: Number Concepts for Teachers

I. COURSE DESCRIPTION FROM CATALOG:

Introduction to sets and operations on sets, properties and operations on whole numbers, integers, rational and real numbers. (Lecture 3, Credit 3)

II. PREREQUISITE(S):

Minimum of two years high school algebra and one year of high school geometry.
Admission is restricted to students majoring in Elementary Education.

III. COURSE OBJECTIVE(S):

Build on (not replicate) the competencies gained through the study of two years of high school algebra and one year of high school geometry. Use mathematics to solve problems and determine if the solutions are reasonable. Use mathematics to model real world behaviors and apply mathematical concepts to the solution of real-life problems. Make meaningful connections between mathematics and other disciplines. Use technology for mathematical reasoning and problem solving. Apply mathematical and/or basic statistical reasoning to analyze data and graphs.

1. Introduce inductive reasoning and help develop problem solving strategies;
2. Review elementary set theory and expose the student to elementary logic;
3. Examine and compare different numeration systems;
4. Analyze the different subsets of real numbers (natural numbers, whole numbers, integers, etc.)

IV. STUDENT LEARNING OUTCOMES:

Upon successful completion of the course the student will be able to: recognize an addition, subtraction, multiplication, and division problem, respectively, and use appropriate mathematical terminology to express these problems; demonstrate various models, properties, and algorithms of addition, subtraction, multiplication, and division, respectively, on integers, fractions, and decimals; and demonstrate basic mental mathematical skills in both computing an exact value and approximating. This course addresses the needs of prospective elementary teachers to understand and explain these skills in an elementary school environment.

V. TOPICS TO BE COVERED:

- Introduction to Problem Solving
- Introduction to Set Theory
- Numbers
  - Place Value
    - Decimal system
    - Other base systems
    - Counting, comparing, and rounding
  - Real numbers
    - Natural numbers
    - Whole numbers
    - Integers
    - Rational numbers
    - Irrational Numbers

- o Fractions
  - Meaning of fractions (Not necessarily rational numbers)
  - Equivalent fractions
  - Comparing fractions
  - Percents
- Real numbers operations
  - o Addition and Subtraction
    - Meaning
    - Properties of Addition
    - Addition and subtraction with the decimal system (and other bases)
    - Addition and subtraction with integers
    - Addition and subtraction with fractions
    - Mental Math
  - o Multiplication
    - Meaning
    - Properties of Multiplication
    - Distributive property (Model pictorially)
    - Factors and Multiples
      - Greatest Common Factor and Least Common Multiples
      - Prime numbers and prime factorization
      - Even and odd
      - Divisibility tests
    - Multiplication with the decimal system (and other bases)
    - Multiplication with integers
    - Multiplication with fractions
    - Mental Math
  - o Division
    - Meaning
    - Division with an integer divisor
    - Division with fractions
    - Division with a non-integer divisor
    - Ratio and proportion
    - Mental Math

VI. ADDITIONAL INFORMATION:

This course may be used to satisfy the minimum general education requirements in mathematics.

VII. POSSIBLE TEXTS AND REFERENCES:

A Problem Solving Approach to Mathematics for Elementary School Teachers, 12th ed., Billstein Libeskind, and Lott

VIII. ANY TECHNOLOGY THAT MAY BE USED:

IX. STUDENT ACADEMIC INTEGRITY POLICY

Maintaining high standards of academic integrity in every class is critical to the reputation of Tennessee Tech, its students, faculty, alumni, and the employers of Tennessee Tech graduates. Academic integrity is at the foundation of the educational process and key to student success. Students with academic integrity are committed to honesty, ethical behavior, and avoiding academic integrity violations. All students must read and understand Policy 216: Student Academic Integrity. Please see the Academic Integrity website (https://www.tntech.edu/provost/academicintegrity/) for more information.

X. DISABILITY ACCOMMODATION

Students with a disability requiring accommodations should contact the accessible education center (AEC). An accommodation request (AR) should be completed as soon as possible, preferably by the end of the first week of the course. The AEC is located in the Roaden University Center, room 112; phone 931-372-6119. For details, view Tennessee Tech's policy 340 – services for students with disabilities at policy central.