COURSE INFORMATION FORM

DISCIPLINE: Math 135
COURSE TITLE: Number Systems for Elementary Teachers

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CATALOG DESCRIPTION
Designed for elementary school teachers. A constructive development of the real number system beginning with the system of whole numbers; concepts from elementary number theory; applications of quantitative systems to problems in discrete mathematics.

PREREQUISITES
Math 119 or above

EXPECTED STUDENT OUTCOMES IN THE COURSE
Upon completion of this course, the student will be able to:
Note: These outcomes are all associated with the educational setting related to elementary education and how these items will relate to the classroom usage, demonstration and teaching.

1. Apply set theory concepts.
2. Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers, and number systems.
3. Demonstrate an understanding for whole number, integer, fraction, and decimal operations.
4. Use and explain whole number, integer, fraction, and decimal algorithms.
5. Use factors, multiples, prime factorization, and relatively prime numbers to solve problems.
6. Use strategies of estimation to judge the reasonableness of results.
7. Use and explain place-value structure of the base-ten number system.
8. Describe mathematical relationships and functions with tables, graphs, and rules.
10. Describe how various cultures have impacted the historical development of mathematics.
11. Identify characteristics of functions.
CLASS-LEVEL ASSESSMENT MEASURES

Student accomplishment of expected student outcomes will be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

Assessment measures may include some or all of the following:

Written assignments (1-11)
Group assignments (1-11)
Lab assignments (1-11)
Homework (1-11)
Exercises (1-11)
Quizzes (1-11)
Exams (1-11)
Papers (1-11)
Special projects (1-11)
Classroom demonstrations (1-11)
Comprehensive final exam (1-11)

PROGRAM-LEVEL OUTCOMES ADDRESSED

General Education Outcomes
Specify which general education outcomes, if any, are substantially addressed by the course by completing the “Course/Program Assessment Matrix” to show the relationship between course and program outcomes and assessment measures.

Quantitative Literacy, Critical Thinking

Occupational Program Outcomes
Specify which occupational program outcomes, if any, are substantially addressed by the course by completing the “Course/Program Assessment Matrix” to show the relationship between course and program outcomes to assessment measures.
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. Set theory
   a. Subsets
   b. Intersections, Unions and compliments.
   c. Cartesian products.
   d. Venn diagrams.

II. Whole Numbers
    a. Definitions and properties of arithmetic.
    b. Modeling using objects, pictures and symbols.
    c. Estimation
    d. Problem Solving and applications.

III. Integers.
     a. Definitions and properties of arithmetic including closure, commutative, and associative.
     b. Definitions and properties of exponents.
     c. Problem solving and applications.

IV. Number Theory
     a. Divisibility rules.
     b. Prime and composite numbers, including the Sieve of Eratosthenes.
     c. Fundamental theorem of Arithmetic.
     d. Relative prime numbers.
     e. Problem solving and applications.

V. Rational Numbers.
   b. Definitions and properties of arithmetic.
   c. Proportions.
   d. Problem solving and applications.

VI. Decimals
    a. Definitions and properties of arithmetic.
    b. Expanded form.
    c. Conversions involving decimals numbers and fractions.
    d. Rounding.
    e. Scientific Notation.
    f. Problem solving and applications.

VII. Numeration Systems.
    a. Roman, Egyptian, Babylonian and Hindu-Arabic Numbers Systems and converging.
    b. Systems other than base-10.
    c. History of the Hindu-Arabic number system.

VIII. Relations and Functions.
      a. Properties of relations including reflexive, symmetric and transitive properties.
      b. Indentify functions.
      c. Domain and range.