Course discipline/number/title: MATH 1050: Foundations of Mathematics-Algebra Emphasis

A.   CATALOG DESCRIPTION
1.   Credits: 3
2.   Hours/Week: 3
3.   Prerequisites (Course discipline/number):  MATH 0094 or MATH 0098 or MATH 0099, READ 0900
4.   Other requirements:  None
5.   MnTC Goals (if any):  Goal 4/Mathematics/Logical Reasoning

B.   COURSE DESCRIPTION:  This course is one of two general education mathematics courses focusing on concepts, operations, and models involved with numeration systems, sets, whole numbers, decimals, integers, rational numbers, real numbers, equations, and functions, with emphasis on estimation problem solving, and mathematical reasoning.  Active and cooperative learning are also emphasized with use of manipulative or E-manipulatives and computer technology incorporated throughout the course.

C.   DATE LAST REVISED (Month, year):  March, 2022

D.   OUTLINE OF MAJOR CONTENT AREAS:
1.   Problem Solving
2.   Reasoning and Logic
3.   Numeration Systems
4.   Whole Numbers and Their Operations
5.   Algebraic Thinking
6.   Number Theory
7.   Integers, Rational and Real Numbers
8.   Proportional Reasoning and Percentage Applications

E.   LEARNING OUTCOMES (GENERAL):  The student will be able to:
1.   Apply and adapt a variety of appropriate and common strategies to solve problems.
     a)   Apply Polya's four-step problem-solving process.
     b)   Recognize patterns and extend arithmetic, geometric and Fibonacci sequences.
     c)   Apply set theory and Venn diagrams to solve problems.
     d)   Apply various mental mathematics and computational estimation strategies.
2.   Identify simple and compound statements in logic.
     a)   Find the converse, inverse, and contrapositive of a given conditional statement.
3.   Illustrate historical and contemporary applications of numeration systems.
     a)   Convert Hindu-Arabic numbers to their equivalents in Egyptian, Mayan, and Roman numeration systems.
     b)   Use multi-base blocks to convert numbers between base ten and other bases.
4.   Translate between equivalent forms of expressions using the commutative, associative, identity and distributive properties of addition and multiplication.
5.   Illustrate closure properties of different sets under multiple operations.
6.   Justify algorithmic procedures using a variety of models or reasoning.
7.   Apply the prime factorization of composite numbers to determine the greatest common factor and the least common multiple of numbers.
8.   Apply the properties and theorems of exponents to simplify rational expressions and to solve rational equations.
9.   Identify the domain and range of a function.
10.  Solve percent and proportion application problems.
11.  Use appropriate technology to model algebraic and number theory applications.

F.   LEARNING OUTCOMES (MNTC):
     Goal 4/ Mathematics/Logical Reasoning: The student will be able to:
1.   Illustrate historical and contemporary applications of mathematics/logical systems.
2.   Clearly express mathematical/logical ideas in writing.
3.   Explain what constitutes a valid mathematical/logical argument (proof).
4.

E.  LEARNING OUTCOMES (MNTC): Continued. . .
    5.  Apply higher-order problem solving and/or modeling strategies.

G.  METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
    1.  Tests
    2.  Quizzes
    3.  Homework
    4.  Cooperative group work
    5.  Computer assignments

H.  RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s): Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I.  SPECIAL INFORMATION (if any):
    1.  A scientific calculator is required.