COMMON COURSE OUTLINE: 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): Minimum grade of C in MATH 0099, MATH 0100, MATH 1113, or higher and college level reading.
4. Co-requisites (Course discipline/number): None
5. MnTC Goals (if any): Goal 2/Critical Thinking, Goal 4/Mathematics/Logical Reasoning

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 E-manipulatives and computer technology incorporated throughout the course.

B. DATE LAST REVISED (Month, year): February, 2014

C. 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. Integers and Number Theory
7. Rational Numbers
8. Real Numbers
9. Proportional Reasoning and Percent’s and Applications

D. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Apply and adapt a variety of appropriate and common strategies to solve problems.
2. Apply Polya’s four-step problem-solving process.
3. Recognize patterns to determine the next term in arithmetic, geometric, and Fibonacci sequences.
4. Illustrate historical and contemporary applications of numeration systems.
5. Identify simple and compound statements in logic.
6. Find the converse, inverse, and contrapositive of a given conditional statement.
7. Convert Hindu-Arabic numbers to their equivalents in Egyptian, Mayan, and Roman numeration systems.
8. Use multi-base blocks to convert numbers between base ten and other bases.
9. Apply set theory and Venn diagrams to solve problems.
10. Demonstrate an understanding of the properties of addition and multiplication of whole numbers – closure, commutative, associative, identity, distributive, and zero multiplication.
11. Apply various mental mathematics and computational estimation strategies.
12. Implement the addition, multiplication, cancellation, and distributive properties to solve equations and application problems involving real numbers.
13. Identify the domain and range of a function.
14. Identify the reflexive, symmetric, and transitive properties of a relation.
15. Recognize prime and composite numbers.
16. Write the prime factorization of composite numbers.
17. Distinguish between greatest common divisor and least common multiple.
18. Apply the properties and theorems of exponents to simplify rational expressions and to solve rational equations.
19. Identify rational and irrational numbers in decimal form.
20. Use proportions to solve application problems.
21. Solve all types of percent problems.
22. Apply the simple and compound interest formulas to solve problems.
23. Use Geometer’s Sketchpad for algebraic and number theory applications.
E. LEARNING OUTCOMES (MNTC):  
Goal 2/Critical Thinking: The student will be able to:  
1. Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and conscious of possible bias in the information selected.  
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives, which can give alternative meanings or solutions to given situations or problems.  
3. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.  
4. Recognize and articulate the value assumptions, which underlie and affect decisions, interpretations, analyses, and evaluations made by ourselves and others.  

Goal 4/Mathematics/Symbolic Systems: 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. Apply higher-order problem solving and/or modeling strategies.  

F. METHODS FOR EVALUATION OF STUDENT LEARNING:  
1. Tests  
2. Quizzes  
3. Homework  
4. Cooperative group work  
5. Writing assignments  
6. Computer assignments  
7. Portfolios  

G. RCTC CORE OUTCOME(S) ADDRESSED:  
☒ Communication ☐ Civic Responsibility  
☒ Critical Thinking ☐ Personal/Professional Accountability  
☐ Global Awareness/Diversity ☐ Aesthetic Response  

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