COLLIN COUNTY COMMUNITY COLLEGE
COURSE SYLLABUS

COURSE NUMBER: MATH 1350
COURSE TITLE: Mathematics for Teachers I
CREDIT HOURS: 3 LECTURE HOURS: 3 LAB HOURS: 0

ASSESSMENTS: Prior to enrolling in this course, the student must demonstrate eligibility to enroll in the following: MATH 1316, MATH 1325, MATH 1350, MATH 2373, or higher.

PREREQUISITE: MATH 1314 College Algebra (3 SCH version) or MATH 1414
COREQUISITE: None

COURSE DESCRIPTION: This course is intended to build or reinforce a foundation in fundamental mathematics concepts and skills. It includes the conceptual development of the following: sets, functions, numeration systems, number theory, and properties of the various number systems with an emphasis on problem solving and critical thinking.

Note: This course is a required part of the approved field of study curriculum for middle grades (4 through 8) teacher certification and is also appropriate for early childhood (EC through 4) education majors.

COLLEGE REPEAT POLICY: Texas residents attempting a course more than twice at Collin College are subject to regular tuition plus an additional $50 per semester credit hour. Undergraduate courses attempted at Collin College with a graded status of A, B, C, D, F, I, W (withdrawals after census), and AU (Audit) will be evaluated for repeat limits. See the current Collin College Catalog for additional information.


SUPPLIES: Scientific or graphing calculator (optional — the use of a calculator is up to the discretion of the instructor)

STUDENT LEARNING OUTCOMES:

Upon completion of this course, the student should be able to do the following:

1. Explain and model the arithmetic operations for whole numbers and integers. (Critical Thinking; Communication)
2. Explain and model computations with fractions, decimals, ratios, and percentages. (Critical Thinking; Communication)
3. Describe and demonstrate how factors, multiples, and prime numbers are used to solve
4. Apply problem solving skills to numerical applications (Critical Thinking; Empirical and Quantitative)

5. Represent and describe relationships among sets using the appropriate mathematical terminology and notation. (Communication)

6. Compare and contrast structures of numeration systems. (Critical Thinking)

COURSE REQUIREMENTS: Attending lectures, completing assignments, and completing exams.

COURSE FORMAT: Lecture and guided practice

METHOD OF EVALUATION: A minimum of four written exams and a comprehensive final exam. Homework and/or quizzes may be used in place of one exam or in addition to exams. The weight of each of these components of evaluation will be specified in the individual instructor’s addendum to this syllabus. All out-of-class course credit, including take-home exams, home assignments, service-learning, etc. may not exceed 25% of the total course grade; thus, at least 75% of a student’s grade must consist of exams given in the class or testing center, and no student may retake any of these exams.

ATTENDANCE POLICY: Attendance is expected of all students. If a student is unable to attend, it is his/her responsibility to contact the instructor to obtain assignments. Please see the schedule of classes for the last day to withdraw from the course with a grade of W.

RELIGIOUS HOLY DAYS: In accordance with section 51.911 of the Texas Education Code, the college will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within a reasonable time. A copy of the state rules and procedures regarding holy days and the form for notification of absence from each class under this provision are available from the Admissions and Records Office. Please refer to the current Collin Student Handbook.

ADA STATEMENT: Collin College will adhere to all applicable federal, state and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student’s responsibility to contact the ACCESS office, SCC-D140 or 972.881.5898 (V/TTD: 972.881.5950) to arrange for appropriate accommodations. See the current Collin Student Handbook for additional information.

ACADEMIC ETHICS: Please see section 7-2.2 of the Collin Student Handbook. Contact the Dean of Students at 972.881.5771 for the student disciplinary process and procedures.

COURSE CONTENT: Proofs and derivations will be assigned at the discretion of the instructor. The student will be responsible for knowing all definition and statements of theorems for each section outlined in the following modules.

Module 1: Numeration Systems and Sets
The student will be able to:

1. Describe different systems of numeration
2. Write a number in expanded form
3. Convert numbers into and out of base 10.
4. Perform arithmetic operations on numbers in bases other than base 10.
5. Define a set and its elements
6. Determine if a set is well-defined
7. Find the cardinal number of a set
8. Distinguish between a finite set and an infinite set
9. Describe a set using a list and set-builder notation
10. Define equal and equivalent sets
11. Define a subset and a proper subset
12. Systematically list all subsets of a set
13. Define the empty set
14. Perform operations on sets (intersection, union, complement)
15. Use Venn diagrams to perform set operations
16. Find the Cartesian product of two sets

Module 2: Whole Numbers, Number Theory, and Integers

The student will be able to:

1. Define the sets of natural numbers and whole numbers
2. Describe different models for the four arithmetic operations on whole numbers
3. Explain the properties of the four arithmetic operations on whole numbers
4. Perform different algorithms for the four arithmetic operations on whole numbers
5. Investigate strategies for mental arithmetic
6. Investigate strategies for estimating answers to arithmetic problems
7. Define even and odd numbers
8. Understand the difference between divides, factor, divisor, multiple
9. Explain the divisibility rules for 2, 3, 4, 5, 6, 8, 9, and 10
10. Determine whether a whole number is prime or composite
11. Write the prime factorization of a whole number
12. Understand the Fundamental Theorem of Arithmetic
13. Determine the number of divisors of a whole number
14. Find the greatest common divisor (GCD) of two or three whole numbers using multiple methods
15. Find the greatest common divisor (LCM) of two or three whole numbers using multiple methods
16. Define the set of integers
17. Define absolute value
18. Describe different models for the four arithmetic operations on integers
19. Explain the properties of the four arithmetic operations on integers
20. Apply the order of operations

**Module 3: Rational Numbers and Proportional Reasoning**

The student will be able to:

1. Define the set of rational numbers
2. Determine if a rational number is proper or improper
3. Simplify a rational number
4. Determine if two rational numbers are equivalent
5. Create equivalent fractions
6. Model rational numbers
7. Discuss the denseness of the rational numbers
8. Arrange a set of rational numbers in order from smallest to largest
9. Find a fraction in between two other fractions using more than one method
10. Perform and explain the four arithmetic operations with rational numbers
11. Describe different models for the four arithmetic operations on rational numbers
12. Convert between mixed numbers and improper fractions
13. Investigate strategies for estimating answers to arithmetic problems involving rational numbers
14. Investigate strategies for mental arithmetic with rational numbers
15. Define exponentiation as repeated multiplication
16. Define negative exponents and use the properties of exponents
17. Define ratio and proportion
18. Use proportions to solve various application problems

**Module 4: Decimals and Percents**

The student will be able to:

1. Understand the connection between decimals and fractions
2. Write a decimal in words
3. Write a decimal in expanded form with place values
4. Write a decimal as a rational number (and vice versa)
5. Arrange a set of decimals in order from smallest to largest
6. Perform and explain the four arithmetic operations with decimals
7. Express numbers in scientific notation
8. Round a decimal to the nearest given place value
9. Classify decimals as either repeating, terminating, or non-terminating
10. Write a repeating decimal as a rational number
11. Define percent as a ratio
12. Use percents to solve application problems
13. Investigate strategies for mental arithmetic with percents
Module 5: Irrational Numbers, Real Numbers and Functions

The student will be able to:

1. Define the set of irrational numbers
2. Define the set of real numbers
3. Define square roots and other roots
4. Simplify roots
5. Use the Pythagorean theorem
6. Classify a number as natural, whole, integer, rational, irrational, or real.
7. Define a variable
8. Translate statements into mathematical expressions or equations using variables
9. Discover and write equations for algebraic patterns
10. Use properties of equality to solve equations
11. Determine if a relation is a function
12. Determine the domain and range of a function
13. Represent a function as a rule, machine, equation, arrow diagram, table, set of ordered pairs, and a graph
14. Graph a linear function
15. Interpret graphs of functions
16. Calculate the composition of functions