COLLIN COUNTY COMMUNITY COLLEGE
COURSE SYLLABUS

COURSE NUMBER: MATH 1414
COURSE TITLE: College Algebra
CREDIT HOURS: 4
LECTURE HOURS: 4
LAB HOURS: 0

ASSESSMENTS: Prior to enrolling in this course, the student must meet TSI college-readiness standard for Mathematics or equivalent.

PREREQUISITE: TSI placement.

COREQUISITE: None

COURSE DESCRIPTION: In-depth study and applications of polynomial, rational, radical, exponential and logarithmic functions, and systems of equations using matrices. Additional topics such as sequences, series, probability, and conics may be included. Note: Students may take either MATH 1314 or MATH 1414 but not both.


SUPPLIES: TI Graphing calculator required

STUDENT LEARNING OUTCOMES:

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

1. Demonstrate and apply knowledge of properties of functions, including domain and range, operations, compositions, and inverses. (Critical Thinking and Communication Skills)
2. Recognize and apply polynomial, rational, radical, exponential and logarithmic functions and solve related equations. (Empirical/Quantitative, Critical Thinking and Communication Skills)
3. Apply graphing techniques.
4. Evaluate all roots of higher degree polynomial and rational functions. (Empirical/Quantitative)
5. Recognize, solve and apply systems of linear equations using matrices. (Empirical/Quantitative, Critical Thinking and Communication Skills)

COURSE REQUIREMENTS: Attending class, completing homework assignments, completing required exams.

COURSE FORMAT: Lecture and guided practice.

METHOD OF EVALUATION: A minimum of four written exams, online homework, 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 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

The student will be able to:

1. Evaluate functions including the Difference Quotient and Piecewise-Defined Functions.
2. Determine the domain and range of functions.
3. Determine intervals over which functions are increasing, decreasing, or constant.
4. Find relative maxima or minima of functions from graphs.
5. Determine if functions are even, odd or neither from equations and graphs.
6. Graph common functions including linear, quadratic, cubic, square root, cube root, reciprocal, absolute value, and piecewise-defined functions.
7. Interpret transformations on common functions including shifts, reflections, stretches and shrinks (compressions).
8. Form the Sum, Difference, Product, Quotient, and Composition of functions.
9. Use the Horizontal Line Test to test for one-to-one functions.
10. Verify or find inverses of functions algebraically and graphically.
Module 2

The student will be able to:
11. Sketch quadratic functions.
12. Solve application problems using parabolas and solve related equations.
13. Identify zeros of polynomials and their multiplicity.
15. Use synthetic division to find zeros and factors of polynomial functions.
16. Evaluate polynomial functions for given values using the Remainder Theorem.
17. Find complex zeros of polynomial functions.
18. Apply the Rational Zero Theorem.
19. Know that complex zeros occur in conjugate pairs.
20. Know the implications of the Fundamental Theorem of Algebra.
21. Know the implications of the Linear Factorization Theorem.
22. Determine the domain of rational functions.
23. Determine the vertical, horizontal, and oblique (slant) asymptotes of rational functions.
24. Apply rational and radical functions and solve related equations.

Module 3

The student will be able to:
25. Graph exponential and logarithmic functions including transformations.
26. State the domain, range and asymptotes of exponential and logarithmic functions.
27. Evaluate logarithms.
28. Use properties of logarithms.
29. Solve exponential and logarithmic equations.
30. Apply solution techniques to solve application problems relating to growth and decay.

Module 4

The student will be able to:
31. Convert systems of linear equations to augmented matrix form.
32. Use Gauss-Jordan Elimination to solve systems of linear equations with two and three variables and equations using elementary row operations.
33. Use matrices to solve real life applications.
34. Write the terms of a sequence.
35. Use sigma notation for sums.
36. Determine the common difference of arithmetic sequences.
37. Determine the common ratio of geometric sequences.
38. Find the formula for the \( n \)th term of arithmetic and geometric sequences.
39. Find the sum of the first \( n \) terms of arithmetic and geometric sequences.
40. Find the sum of an infinite geometric series.