

## COLLIN COLLEGE EXPANDED GENERIC COURSE SYLLABUS

### COURSE INFORMATION

**Course Number:** MATH 1314

**Course Title:** College Algebra

**Credit Hours:** 3

**Lecture Hours:** 3

**Lab Hours:** 0

#### Prerequisite

MATH 0314 with a grade of C or better, or MATH 0324 with a grade of C or better, or meet TSI college-readiness standard for Mathematics; or equivalent.

#### 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.

#### Textbook/Supplies

*College Algebra*, 8th edition by Blitzer, Pearson.

Supplies: Graphing calculator may be required.

### STUDENT LEARNING OUTCOMES (SLO)

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)

## REQUIRED CORE OBJECTIVES FOR MATHEMATICS

As per the Texas Higher Education Coordinating Board, mathematics students must develop and demonstrate the following three required core objectives:

- Critical Thinking Skills - creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
- Communication Skills - effective development, interpretation and expression of ideas through written, oral and visual communication.
- Empirical and Quantitative Skills - manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

## METHOD OF EVALUATION

### Course requirements

Attending class, completing course assignments, and completing required exams.

### Course format

Lecture and guided practice.

A minimum of three proctored exams, three core assessments, online homework, and a proctored comprehensive departmental final exam are required. Online homework is required and must be incorporated in the overall course grade. The final exam must be comprehensive (i.e., include questions from all chapters) and must count for at least 20% of the total course grade. Graded core assessments will count for 5%–10% of the overall course grade. The specific weight of each graded component will be detailed in the individual instructor's syllabus. Credit for all out-of-class coursework, including homework assignments, service-learning projects, and other assessments and learning activities, may not exceed 25% of the total course grade. At least 75% of a student's grade must consist of proctored exams. No student may retake any of these exams.

### Core Assessment Statement

Core assessments consist of problems or tasks that measure student achievement of state required core objectives – Critical Thinking Skills, Communication Skills, and Empirical and Quantitative Skills. These assessments are designed to be meaningful and require students to extend and apply course concepts. Students should be able to clearly see how these assessments reflect both the skills they are developing and the outcomes of the course.

## COURSE POLICIES

*College-wide policies are pre-loaded into the Concourse Syllabi and are not duplicated in the Expanded Generic Syllabi for each course.*

*Instructor specific policies should be added to the Concourse Syllabus.*

## COURSE CONTENT AND MODULE LEARNING OBJECTIVES

The student will be responsible for learning the objectives outlined in the following modules:

### Module 1

The student will be able to:

1. Apply rational and radical functions and solve related equations. SLO 2
2. Evaluate functions including the difference quotient and piecewise-defined functions. SLO 1
3. Determine the domain and range of functions. SLO 1
4. Determine intervals over which functions are increasing, decreasing, or constant. SLO 1
5. Find relative maxima or minima of functions from graphs. SLO 1
6. Determine if functions are even, odd or neither from equations and graphs. SLO 1
7. Graph common functions including linear, quadratic, cubic, square root, cube root, reciprocal, absolute value, and piecewise-defined functions. SLO 3
8. Interpret transformations on common functions including shifts, reflections, stretches and shrinks. SLO 3
9. Form the sum, difference, product, quotient, and composition of functions. SLO 1
10. Determine the slope of a line. SLO 1
11. Write linear functions using the slope-intercept form and point-slope formula. SLO 1
12. Apply linear functions. SLO 1

### Module 2

The student will be able to:

1. Solve application problems using parabolas and solve related equations. SLO 2
2. Identify zeros of polynomials and their multiplicity. SLO 2 & 4
3. Sketch graphs of polynomial functions. SLO 3
4. Use synthetic division to find zeros and factors of polynomial functions. SLO 2 & 4
5. Evaluate polynomial functions for given values using the Remainder Theorem. SLO 2 & 4
6. Find complex zeros of polynomial functions. SLO 2 & 4
7. Apply the Rational Zero Theorem. SLO 2 & 4
8. Apply the conjugate pairs theorem to find all zeros of a polynomial function. SLO 2 & 4
9. Apply the Fundamental Theorem of Algebra. SLO 2 & 4
10. Apply the Linear Factorization Theorem. SLO 2 & 4
11. Determine the domain of rational functions. SLO 1 & 2
12. Determine the vertical, horizontal, slant asymptotes of rational functions. SLO 2
13. Apply rational functions and solve related equations. SLO 2

### Module 3

The student will be able to:

1. Use the horizontal line test to test for one-to-one functions. SLO 1
2. Verify or find inverses of functions algebraically and graphically. SLO 1
3. Graph exponential and logarithmic functions including transformations. SLO 2 & 3
4. State the domain, range, and asymptotes of exponential and logarithmic functions. SLO 1 & 2
5. Evaluate logarithms. SLO 2
6. Use properties of logarithms. SLO 2
7. Solve exponential and logarithmic equations. SLO 2
8. Apply solution techniques to solve application problems relating to growth and decay. SLO 2

### Module 4

The student will be able to:

1. Solve problems using systems of linear equations. SLO 5
2. Convert systems of linear equations to augmented matrix form. SLO 5
3. Use Gauss-Jordan Elimination to solve systems of linear equations with two and three variables and equations using elementary row operations. SLO 5
4. Describe what the variables represent, write equations, and use matrices to solve real life applications including inconsistent systems and dependent equations. SLO 5
5. Write the terms of a sequence. SLO 1
6. Use sigma notation for sums. SLO 1