

## COLLIN COLLEGE EXPANDED GENERIC COURSE SYLLABUS

### COURSE INFORMATION

**Course Number:** MATH 1314

**Course Title:** College Algebra

**Credit Hours:** 3

**Lecture Hours:** 3

**Lab Hours:** 1

#### 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. Lab required.

#### 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 homework assignments, completing labs, and completing required exams.

### Course format

Lecture, lab, and guided practice.

Online homework is required in all lecture sections and will count 10-15% of the overall course grade. A minimum of four labs (paper and online) will be assigned and will count for 10-15% of the overall course grade. A minimum of four proctored assessments, one of which is the comprehensive final exam will be given. A minimum of 75% of the course grade will come from the proctored assessments which includes the departmental final exam. The comprehensive departmental final exam will count for 20% of the overall course grade. There are no retakes on any exams.

### Lab Statement

Labs must consist of problems that require the students to extend or apply the concepts learned in College Algebra. They are meaningful and fulfill the course's learning outcomes while assessing the core objectives skills of critical thinking, communication, and empirical/quantitative analysis. Students are expected to see a clear connection between lab assignments and the course outcomes. The labs will be completed outside of class, and will be graded and recorded as part of the course grade.

## 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