

City Colleges of Chicago  
Course Title: College Algebra

**Length of course:** 16 Weeks

**Contact Hours:** 4 Contact Hours

**Credit Hours:** 4 Credit Hours

**Lecture Hours:** 4 Lecture Hours

**Lab Hours:** 4 Lab Hours

**Weekly Plan:** 4 Hours

**Catalogue Description:**

College Algebra emphasizes the notion of a function as a unifying concept. The following families of functions and their characteristics are examined within this course: polynomial, rational, exponential and logarithmic functions. Additional topics will include solving inequalities and systems of non-linear equations. Writing assignments, as appropriate to the discipline, are part of the course. Applications involving problem-solving skills will be emphasized throughout the course.

**Students the Course is Expected to Serve:**

This course is intended for students who plan to major in business, mathematics, engineering, and science.

**Pre-requisites:**

Prerequisite -- MATH 099 With a minimum grade of 'C' or Placement Test -- or Consent of Chair --

**Course Objectives:**

1. Analyze the graphs of various families of functions.
2. Apply the models and characteristics of various families of functions to scenarios in order to solve real-world (contextual) problems.

**Student Learning Outcomes:**

Upon satisfactory completion of the course, students will be able to:

- A. **Polynomial Functions.** Identify the characteristics of a quadratic function (i.e., vertex, axis of symmetry, and direction of concavity).
- B. Compute roots/zeros of a polynomial function by factoring techniques.
- C. Estimate the roots/zeros of a polynomial function.
- D. Solve polynomial inequalities.
- E. Solve systems of linear equations using matrices and determinants.
- F. Solve systems of linear inequalities.
- G. Solve systems of non-linear equations.
- H. **Rational Functions.** Simplify rational expressions using the division algorithm.
- I. Identify points of discontinuity of a rational function.
- J. Identify vertical/horizontal asymptotes and end behavior of rational functions.
- K. Solve rational inequalities.
- L. **Exponential and Logarithmic Functions.** Define exponential and logarithmic functions.
- M. Simplify exponential and logarithmic expressions using their properties.
- N. Solve exponential and logarithmic equations.

- O. Formulate and apply exponential and logarithmic functions to a contextual situation.
- P. **It is expected that the following student learning outcomes (Characteristics of Functions) will be embedded, as appropriate, in the study of the family of functions listed above.** Identify the domain and range of a function.
- Q. Determine intervals on which functions are decreasing/increasing, continuous/non-continuous, or piecewise.
- R. Identify functions from multiple sources of information (i.e., verbal descriptions, graphs, equations, and tables of values).
- S. Relate the effect of transformations (i.e., translations, rescaling, or reflections) on graphs of functions and their corresponding equations.
- T. Perform operations (i.e., addition, subtraction, multiplication and division) on functions, including the composition of functions.
- U. Decompose a function into a composition of two or more functions.
- V. Formulate and apply a function to a contextual situation.
- W. Determine the conditions under which a function has an inverse.
- X. Identify the inverse of a function from multiple representations.
- Y. Reformulate a given function into various representations (i.e., verbal, graphical, algebraic, or tabular).

#### Topical Outline:

Suggested Timeframe only

##### Week

1 - 5

6 - 10

11 - 16

##### Topic

Concept of a Function (Review)

Polynomial Functions

Rational Functions

Exponential and Logarithmic Functions

#### Calendar:

#### Methods of Evaluation:

**Total Percentage:** 0%

The weight given to exams, quizzes, and other instruments used for evaluation will be determined by the instructor.

#### Methods of Assessment:

Exams, quizzes, homework and other assessments will be used as appropriate to measure student learning.

#### Methods of Instruction:

Problem-based and contextual activities, collaborative-learning techniques, and lecture will be used as appropriate.

#### Recommended Text:

1. Coburn, John W. *College Algebra* 1st Edition, McGraw Hill, 2007
2. Sullivan, Michael *College Algebra* 7th Edition, Prentice Hall, 2005