Administrative Unit: Computer and Mathematical Sciences Department

Course Prefix and Number: MATH 150

Course Title: College Algebra

Number of Credit Hours: 3  Lecture Hours: 3  Laboratory Hours: 0

Catalog Description: Study of algebraic concepts including linear and quadratic equations, inequalities and systems; polynomials, rational, exponential and logarithmic functions in the natural and social sciences with emphasis on their numerical, graphical, and algebraic properties and their applications. Introduction to summation notation, sequences, and series.  

Prerequisites: Grade of C or better in MATH 106 or a score of 21 or above on the math portion of the ACT (or if the ACT was taken before September 1989, a score of 20), or a passing score on the Columbia College math placement exam. G.E.

Prerequisite(s)/Corequisite(s): Grade of C or better in MATH 106 or a score of 21 or above on the math portion of the ACT (or if the ACT was taken before September 1989, a score of 20), or a passing score on the Columbia College math placement exam.

Text(s):  


Course Objectives:

• To communicate mathematically in both written and verbal forms.
• To reason with symbolic and graphical representations.
• To use mathematics to solve real-world problems.
• To use appropriate technology, such as graphing calculators and computers, to enhance their mathematical understanding.
• To understand intuitively and formally the mathematical idea of a function and its real world applications.

Measurable Learning Outcomes:

• Simplify exponential and radical expressions and solve equations containing such expressions.
• Solve linear, quadratic, and polynomial equations and inequalities in both real number and complex number domains.
• Add, subtract, multiply, and divide complex numbers.
• Find and graph equations of lines in both point-slope and slope-intercept form.
• Find equations for circles and graph circles in the Cartesian plane.
• Determine if a relation is a function.
• Identify the domain and range of polynomial, radical, rational, exponential, logarithmic, and piecewise-defined functions, and evaluate their values.
• Graph polynomial, radical, rational, exponential, logarithmic, and piecewise-defined functions.
• Use the graph of a function to identify characteristics of the function such as specific values and symmetry.
• Recognize graphs of common functions and graph transformations of these common functions.
• Combine functions arithmetically and through composition and identify the domain of the resulting functions.
• Demonstrate an understanding of the fundamental concepts associated with inverse functions including the definition of one-to-one functions and the graphical interpretation of inverses.
• Identify characteristics of the graphs of polynomial functions including end behavior and degree.
• Apply the Fundamental Theorem of Algebra and related results to obtain a complete factorization of a polynomial function.
• Identify vertical, horizontal, and slant asymptotes of rational functions.
• Simplify exponential and logarithmic expressions and solve exponential and logarithmic equations.
• Solve systems of linear equations in two and three variables and nonlinear systems in two variables.
• Find terms of sequences and identify arithmetic and geometric sequences.
• Use summation notation and compute the sum of sequences including arithmetic and geometric sequences.
• Solve real-world problems using a variety of linear, polynomial, rational, exponential, and logarithmic models.

Topical Outline (major areas of coverage):

• Radicals, integer and rational exponents (Review)
• Linear and Quadratic equations and inequalities
• The Cartesian Plane and Graphs
• Functions and their Graphs
• Polynomial and rational functions and graphs
• Exponential and Logarithmic functions and graphs
• Systems of equations
• Sequences and series

Recommended maximum class size for this course: 30

Library Resources: Online databases are available at http://www.ccis.edu/offices/library/resources.asp. You may access them from off-campus using your eServices login and password when prompted.

Prepared by: Ann Bledsoe
NOTE: The intention of the master syllabus is to provide an outline of the contents of this course, as specified by the faculty of Columbia College, regardless of who teaches the course, when it is taught or where it is taught. Faculty members teaching this course for Columbia College are expected to facilitate learning pursuant to the course objectives and cover the subjects listed in the topical outline. However, instructors are also encouraged to cover additional topics of interest so long as those topics are relevant to the course’s subject. The master syllabus is, therefore, prescriptive in nature but also allows for a diversity of individual approaches to course material.

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