Hawai'i Community College

# Course Syllabus

COURSE TITLE:

## College Algebra

COURSE IDENTIFICATION: Math 110

CREDIT HOURS: 3

PREREQUISITES: "C" or better in Math 27 (or equivalent) or placement (by an approved college-entry assessment test) AND Eng 21 or placement in Eng 102

DIVISION: Natural Science & Mathematics

**DEPARTMENT:** Mathematics

INSTRUCTOR: James A. Schumaker

OFFICE LOCATION: EKH-225

OFFICE PHONE: (808) 974-7528

OFFICE HOURS: <u>see current semester information</u>

DATE: January 2011

#### **COURSE DESCRIPTION:**

This course is a continuation of topics from Intermediate Algebra. Topics of study include algebraic equations and inequalities, absolute value, polynomial, rational, exponential and logarithmic functions, conic sections, systems of equations and inequalities, matrices and determinants. Additional topics may include sequences and series, combinatorics, probability and mathematical induction.

Prerequisites: "C" or better in Math 27 (or equivalent), or placement (by an approved college-entry assessment test) AND Eng 21 or placement in Eng 102.

#### **COURSE OBJECTIVES:**

Review the number sets, exponents, and simplifying mathematical expressions.

Demonstrate proficiency in solving one-variable linear and quadratic equations.

Demonstrate proficiency in graphing linear and quadratic functions.

Demonstrate familiarity with one-variable linear and absolute value inequalities.

Demonstrate familiarity with the general aspects of functions; including their definition, notation, operations, and inverses.

Demonstrate familiarity with Complex numbers and their arithmetic operations.

Demonstrate proficiency in solving one-variable polynomial and rational equations.

Demonstrate familiarity in graphing polynomial and rational functions.

Demonstrate proficiency in solving exponential and logarithmic equations.

Demonstrate proficiency in graphing exponential and logarithmic functions.

Demonstrate proficiency in solving multi-variable systems of linear equations and inequalities. Demonstrate proficiency in matrix operations, properties, determinants and their application in solving systems of equations.

Demonstrate familiarity with the introductory aspects of the two-variable equations and graphs of the conic sections.

Demonstrate familiarity with the introductory aspects of sequences and series. (optional) Demonstrate familiarity with the introductory aspects of combinatorics and probability theory, and mathematical induction. (optional)

# In addition, as in most mathematical courses, students will be presented with the challenge of utilizing critical thinking along with development of communicating their analyzes in an ordered and neat fashion.

#### **INSTRUCTIONAL MATERIALS:**

Textbook:	College Algebra – Fifth Edition by Mark Dugopolski
Calculators:	A scientific calculator is required.
Recommended:	Graph paper or engineering pad;
	A loose-leaf notebook for storing HomeWork, exams,
	quizzes, and notes.

### MATHEMATICS 110 / College Algebra

## Course Outline

#### UNIT I. PREREQUISITES

Real Numbers and Their Properties; Integral Exponents and Scientific Notation; Rational Exponents and Radicals; Polynomial and Rational Expressions, Complex Numbers

#### UNIT II. EQUATIONS, INEQUALITIES And MODELING

Equations in One Variable; Modeling to Solve Problems; Equations and Graphs In Two Variables; Linear Equations in Two Variables; Scatter Diagrams and Curve Fitting; Quadratic Equations; Linear and Absolute Value Inequalities.

#### UNIT III. FUNCTIONS And GRAPHS

Functions; Graphs of Relations and Functions; Families of Functions, Transformations, and Symmetry; Operations with Functions, Inverse Functions, Constructing Functions with Variation.

#### UNIT IV. POLYNOMIAL And RATIONAL FUNCTIONS

Quadratic Functions and Inequalities; Complex Numbers; Zeros of Polynomial Functions; Theory of Equations; Miscellaneous Equations; Graphs of Polynomial Functions; Rational Functions and Inequalities.

#### UNIT V. EXPONENTIAL And LOGARITHMIC FUNCTIONS

Exponential Functions and Their Applications; Logarithmic Functions and Their Applications; Rules of Logarithms; More Equations and Applications.

#### UNIT VI. SYSTEMS OF EQUATIONS And INEQUALITIES

Systems of Linear Equations in Two Variables; Systems of Linear Equations in Three Variables; Nonlinear Systems of Equations; Partial Fractions; Inequalities And Systems of Inequalities in Two Variables; Linear Programming.

#### **UNIT VII. MATRICES And DETERMINANTS**

Solving Linear Systems Using Matrices; Operations with Matrices; Multiplication of Matrices; Solution of Linear Systems in Two Variables Using Determinants; Solutions of Linear Systems in Three Variables Using Determinants.

#### **UNIT VIII. The CONIC SECTIONS**

The Parabola; The Ellipse and the Circle; The Hyperbola.

#### UNIT IX. SEQUENCES, SERIES, And PROBABILITY (Optional)

Sequences; Series; Geometric Sequences and Series; Counting and Permutations; Combinations, Labeling and the Binomial Theorem; Probability; Mathematical Induction.