

# MAT 171 Precalculus Algebra

## COURSE DESCRIPTION:

Prerequisite(s): Take One Set:

Set 1: DMA-010, DMA-020, DMA-030, DMA-040, DMA-050

Set 2: DMA-010, DMA-020, DMA-030, DMA-045

Set 3: DMA-025, DMA-045

Set 4: DMA-025, DMA-040, DMA-050

Set 5: MAT 121

Set 6: MAT-003

Set 7: BSP-4003

Corequisite(s): Take MAT-071

This course is designed to develop topics which are fundamental to the study of Calculus. Emphasis is placed on solving equations and inequalities, solving systems of equations and inequalities, and analysis of functions (absolute value, radical, polynomial, rational, exponential, and logarithmic) in multiple representations. Upon completion, students should be able to select and use appropriate models and techniques for finding solutions to algebra-related problems with and without technology.

*This is a Universal General Education Transfer Component (UGETC) course.*

Course Hours Per Week: Class, 3. Lab, 2. Semester Hours Credit, 4.

## LEARNING OUTCOMES:

Upon completing requirements for this course, the student will be able to:

1. Use analytical, graphical, and numerical representations to solve absolute value, radical, polynomial, rational, exponential, and logarithmic equations with both real and complex solutions.
2. Use analytical, graphical, and numerical representations to solve absolute value, polynomial and rational inequalities with real solutions.
3. Use analytical, graphical, and numerical representations to analyze absolute value, radical, polynomial, rational, exponential and logarithmic functions with both real and complex zeros.
4. Use multiple methods to solve problems involving systems of equations and apply to decomposing partial fractions.
5. Construct the composition and inverse of functions.
6. Use polynomial, exponential and logarithmic functions to model various real-world situations in order to analyze, draw conclusions, and make predictions.

## OUTLINE OF INSTRUCTION:

- I. Graphs
  - A. Solving Rational Equations
  - B. Solving Absolute Value Equations and Inequalities
  - C. Rectangular Coordinates; Graphing Utilities
  - D. Introduction to Graphing Equations
  - E. Intercepts; Symmetry; Graphing Key Equations

## II. Functions and Their Graphs

- A. Functions
- B. The Graph of a Function
- C. Properties of Functions
- D. Library of Functions; Piecewise-defined Functions
- E. Graphing Techniques: Transformations
- F. Mathematical Models: Building Functions

## III. Linear and Quadratic Functions

- A. Linear Functions, Their Properties, and Linear Models
- B. Systems of Linear Equations
- C. Building Linear Models from Data
- D. Completing the Square
- E. Quadratic Functions and Their Properties
- F. Building Quadratic Models from Verbal Descriptions and from Data
- G. Inequalities Involving Quadratic Functions
- H. Complex Numbers

## IV. Polynomial and Rational Functions

- A. Polynomial Functions and Models
- B. The Real Zeros of a Polynomial Function
- C. Complex Zeros: Fundamental Theorem of Algebra
- D. Properties of Rational Functions
- E. The Graph of a Rational Function
- F. Polynomial and Rational Inequalities

## V. Exponential and Logarithmic Functions

- A. Composite Functions
- B. One-to-One Functions; Inverse Functions
- C. Exponential Functions
- D. Logarithmic Functions
- E. Properties of Logarithms
- F. Logarithmic and Exponential Equations
- G. Financial Models
- H. Exponential Growth and Decay Models
- I. Building Exponential and Logarithmic Models from Data

### **REQUIRED TEXTBOOK AND MATERIAL:**

The textbook and other instructional material will be determined by the chair/instructor.