

MAT 121
ALGEBRA/TRIGONOMETRY I

COURSE DESCRIPTION:

Prerequisites: MAT 070 or satisfactory score on placement test

Corequisites: None

This course provides an integrated approach to technology and the skills required to manipulate, display, and interpret mathematical functions and formulas used in problem solving. Topics include simplification, evaluation, and solving of algebraic and radical functions; complex numbers; right triangle trigonometry; systems of equations; and the use of technology. Upon completion, students should be able to demonstrate an understanding of the use of mathematics and technology to solve problems as well as analyze and communicate results. A basic introduction to statistics is also included. Course Hours Per Week: Class, 2. Lab, 2. Semester Hours Credit, 3.

LEARNING OUTCOMES:

1. Students will be able to use techniques of algebra and algebraic formulas to simplify real and complex expressions and manipulate, solve, and graph equations by hand, and perform conversions between systems of measurements. Students will display proficiency by demonstrating the following competencies:
 - a. Convert numbers between the English system and the metric system.
 - b. Evaluate roots of numbers.
 - c. Add, subtract and multiply algebraic expressions.
 - d. Factor algebraic expressions.
 - e. Solve linear equations.
 - f. Solve formulas and literal equations.
 - g. Use linear equations to solve applied verbal problems.
 - h. Identify the characteristics of functions and their graphs.
 - i. Graph linear functions.
 - j. Solve systems of two linear equations graphically and algebraically.
 - k. Solve systems of three linear equations algebraically.
 - l. Solve quadratic equations by factoring and by using the quadratic formula.
 - m. Graph quadratic functions.
 - n. Use the rules of exponents with rational exponents.
 - o. Simplify radicals.
 - p. Add, subtract, multiply and divide radicals.
 - q. Write exponential expressions in logarithmic form and logarithmic expressions in exponential form.
 - r. Define complex numbers.
 - s. Perform operations with complex numbers.
 - t. Represent complex numbers graphically.
 - u. Write complex numbers in polar form and exponential form.

2. Students will be able to define, identify, and perform computations involving right triangle trigonometric ratios. Students will display proficiency by demonstrating the following competencies:
 - a. Identify angles and their measures.
 - b. Find the values of the trigonometric functions
 - c. Solve right triangles
 - d. Solve applied problems involving right triangles.
3. Students will be able to use descriptive statistics to summarize data. Students will display proficiency by demonstrating the following competencies:
 - a. Read and construct frequency distributions.
 - b. Calculate measures of central tendency.

OUTLINE OF INSTRUCTION:

- I. Units of measurement; the metric system
 - A. Reductions and conversions
- II. Basic algebraic operations
 - A. Roots and radicals
 - B. Addition, subtraction and multiplication of algebraic expressions
 - C. Factoring special products
 - D. Factoring common factors and difference of squares
 - E. Factoring trinomials
 - F. Solving equations
 - G. Formulas and literal equations
 - H. Applied verbal problems
- III. Functions and graphs
 - A. Introduction to functions
 - B. Domain and range of functions
 - C. The graph of a function
- IV. Linear equations
 - A. Graphs of linear equations
 - B. Solving systems of two linear equations in two unknowns graphically
 - C. Solving systems of two linear equations in two unknowns algebraically
 - D. Solving systems of three linear equations in three unknowns algebraically
- V. Quadratic equations
 - A. Solution by factoring
 - B. The quadratic formula
 - C. The graph of the quadratic function
- VI. Exponents and radicals

- A. Simplifying expressions with integral exponents
 - B. Fractional exponents
 - C. Simplest radical form
 - D. Addition, subtraction, multiplication and division of radicals
 - E. Exponential and logarithmic functions
- VII. The trigonometric functions
- A. Angles
 - B. Defining the trigonometric functions
 - C. Values of the trigonometric functions
 - D. The right triangle
 - E. Applications of right triangles
- VIII. Complex numbers
- A. Basic definitions
 - B. Basic operations with complex numbers
 - C. Graphical representation of complex numbers
 - D. Polar form of a complex number
 - E. Exponential form of a complex number
- IX. Introduction to statistics
- A. Frequency distributions
 - B. Measures of central tendency

REQUIRED TEXTBOOK AND MATERIALS:

Washington, Allyn J. Basic Technical Mathematics. 9th edition. Pearson Education, 2009.

Scientific calculator

STATEMENT FOR STUDENTS WITH DISABILITIES:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 536-7207, ext. 1413 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.