MAT 122 Algebra/Trigonometry II

COURSE DESCRIPTION:

Prerequisite(s): MAT 121

Corequisite(s): none

This course is designed to cover concepts in algebra, function analysis, and trigonometry. Topics include exponential and logarithmic functions, transformations of functions, Law of Sines, Law of Cosines, vectors, and statistics. Upon completion, students should be able to demonstrate the ability to use mathematics and technology for problem-solving, analyzing and communicating results.

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

LEARNING OUTCOMES:

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

1. Solve relevant contextual problems involving exponential and logarithmic functions
2. Interpret and create transformations of functions.
3. Utilize the Law of Sines and Law of Cosines to solve oblique triangles and their applications.
4. Define vectors and compute vector operations.
5. Apply vector concepts to solve applications.
6. Employ basic statistical concepts to summarize and present data and draw conclusions.

OUTLINE OF INSTRUCTION:

I. Trigonometric Functions of any Angle
   A. Signs of the trigonometric functions
   B. Trigonometric functions of any angle
   C. Radians
   D. Applications of radian measure

II. Graphs of the Trigonometric Functions
   A. Graphs of $y = a \sin x$ and $y = a \cos x$
   B. Graphs of $y = a \sin bx$ and $y = a \cos bx$
   C. Graphs of $y = a \sin (bx+c)$ and $y = a \cos (bx+c)$
   D. Graphs of $y = \tan x$, $y = \cot x$, $y = \sec x$ and $y = \csc x$
   E. Applications of the trigonometric graphs
   F. Composite trigonometric curves
   G. The inverse trigonometric functions

III. Vectors and Oblique Triangles
   A. Introduction to vectors
   B. Components of vectors
   C. Vector addition by components
   D. Applications of vectors
   E. Oblique triangles, the Law of Sines
   F. The Law of Cosines

IV. Complex Numbers
   A. An application to alternating-current circuits

V. Exponential and Logarithmic Functions
   A. Graphs of $y = b^x$ and $y = \log_b x$
   B. Properties of logarithms
   C. Logarithms to the base 10
   D. Natural logarithms
   E. Exponential and logarithmic equations
   F. Applications

VI. Introduction to Statistics
   A. Frequency distributions
   B. Measures of central tendency
   C. Standard deviation
   D. Linear regression

REQUIRED TEXTBOOK AND MATERIAL:

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