Math 1181: Applied Technical Mathematics II

Credit hours: 3 credits

Prerequisites: Math 1179 with a grade of C or better.

Course Description

This course is the second semester of a two-semester sequence covering the essentials of applied technical mathematics. Topics include graphing linear equations, solving systems of linear equations, using trigonometry to solve problems involving vectors, graphical analysis of waveforms, the complex numbers and their applications to AC circuits, an introduction to statistics, and some miscellaneous topics involving non-linear equations

Course Objectives

1. Students will develop their Algebra skills by looking at more complex problems, analyzing graphs of lines and functions, and studying systems of equations.
2. Students will utilize vectors, trigonometry, and other geometric concepts to solve problems.
3. Students will look at applications which include linear and angular velocity, waveforms, and AC circuits.
4. Students will be introduced to more complex mathematical concepts which will include complex numbers and data analysis.

Learning Outcomes

1. Graph a linear equation, understand the concept of slope of a line, write an equation of a line, and find the length of a line segment.
2. Solve systems of two and three variable equations algebraically.
3. Define and use vectors, their components; add vectors graphically and by using components and solve applications problems.
4. Solve oblique triangles using the Law of Sines and Cosines and solve application problems.
5. Work with angles in standard position, find a refence angle, evaluate trigonometric functions for any angle.
6. Use radian measure to find arc length, area of sectors, angular and linear velocity, and graph waveforms.
7. Perform operations with complex numbers, represent graphically, express in polar form, and model AC circuits.
8. Organize data in frequency distribution, calculate measures of central tendency, standard deviation, and graph normal distributions.
9. Work with natural exponential and logarithmic functions.
10. Solve equations involving quadratics, exponential, logarithmic and non-linear systems.

Course Topics

Systems of Equations
- Linear Equations and Graphs of Linear Functions
- System of Equations and Graphical Solutions
- Solving System of Two linear Equations in two Unknowns Algebraically
- Solving Systems of Three Linear equations in Three Unknowns Algebraically

Quadratic Equations
- Quadratic Solutions by factoring
- Square root property (only)
- The Quadratic Formula
- The graph of the Quadratic Function (Including the Vertex Formula)

Trigonometry and Vectors
- Signs of the Trigonometric Function

- Trigonometric Functions of Any Angle
- Radians
- Applications of Radian Measure
- Introduction to Vectors
- Components of Vectors
- Vector Addition by Components
- Oblique Triangles, The Law of Sines
- The Law of Cosines
- Graphs of $y = a \sin x$ and $y = a \cos x$
- Graphs of $y = a \sin bx$ and $y = a \cos bx$
- Graphs of $y = \tan x$ (only)

Complex Numbers

- Basic Definitions
- Basic Operations with Complex Numbers
- Graphical Representation of Complex Numbers
- Polar Form of a Complex Number
- An application to Alternating-current (ac) Circuits.

Exponential and Logarithmic Functions

- Exponential Functions
- Logarithmic Functions
- Properties of Logarithms
- Logarithms to the Base 10
- Natural Logarithms
- Exponential and Logarithmic Equations

Data Analysis

- Graphical display of Data
- Measures of Central Tendency
- Standard Deviation
- Normal Distributions