

1. Course Number and Name:

ENGT 3020 Applied Engineering Mechanics

2. Credits and Contact hours:

Credits: 3 hours, Contact: 3 lecture hours

3. Instructor's or course coordinator's name:

Gary L. Daugherty

4. Text book, title, author, and year:

Technical Mathematics with Calculus, 3rd Edition, Delmar, 2004

a. Other supplemental materials:

Software: MATHLAB

5. Specific Course Information:

a. Brief description of the content of the course (catalog description):

This course provides an introduction to partial derivatives, series expansion of functions, differential equations and Laplace transform analysis. Emphasis is on interpretation of basic concepts and their application to the solution of simplified problems in electrical and mechanical engineering technologies.

b. Pre-requisites, or co-requisites:

MATH 2460 Technical Calculus II

6. Specific goals for the course:

a. Specific outcomes of instruction:

1. Take derivatives of functions of one or two variables and apply these techniques to various physical problems.
2. Approximate functions with Maclaurin, Taylor and Fourier series. Utilize the Euler relationship for complex numbers.
3. Solve first order linear differential equations by several different methods. Apply these techniques to various physical problems.
4. Solve second order linear differential equations using conventional methods. Apply these techniques to harmonic oscillator and RLC Circuit problems.
5. Solve differential equations using numerical techniques.
6. Solve differential equations using basic Laplace transform methods and apply these techniques to several physical problems.
7. Communicate the mathematical results of analyses in written format.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course:

B. An understanding of the analytical skills associated with mechanical engineering technology, as evidenced by the knowledge of functions, derivatives, integrals of single and two variables, partial derivatives, series expansion of functions, solution of first and second order differential equations, and Laplace Transform analysis.

F. An ability to identify, analyze and solve technical problems associated with mechanical engineering technology, as evidenced by the ability to solve mathematical problems in homework, software use and/or exams.

7. Brief list of topics to be covered:

1. Functions
2. Derivatives of Single variables
3. Partial and Total Derivatives of Two Variables
4. Integral of Functions of Single and Two Variables
5. McLaurin and Taylor Series Expansion of Functions
6. Solutions of First Order Differential Equations
7. Solutions of Second Order Differential Equations
8. Laplace and Inverse Transform of Functions
9. Solution of Differential Equations using Laplace Transform Method