### Course Name: Calculus II

### Credit Hours: 3

### Course No.:

### Prerequisites: Calculus I

### Offered: Semester 2

### Co-prerequisites: None

#### Course Description:
This course is the second course to meet the mathematical needs of the electrical engineering students, which covers the following items:


#### Learning Outcomes:
At the end of this course students will be able to:

- Find the partial derivative of a function of several variables.
- Find the tangent plane of a surface, the directional derivative and the gradient of a function of two variable.
- Solving certain types of optimization problems by using Lagrange multipliers.
- Evaluating double and multiple integrals.
- Solve certain types of ordinary and partial differential equations.
- Use Laplace transform and Fourier series to solve some mathematical problems.

#### Teaching / Learning Methodology:

- Lectures.
- Discussion and workshop.
- Homework

#### Course Content Listing:

**Partial Derivatives**

- Partial Derivatives.
• Chain Rule.
• Tangent Plane.
• The Directional Derivative and the Gradient of a function of two variables.
• Optimization Problems and Lagrange multiplier.

Multiple Integrals:
• Double and triple Integrals.

Ordinary Differential Equations:
• Solutions of First, Second, and Higher Linear Ordinary Differential Equations.
• Series Solution of Linear ODE's.
• Solution of System of Linear ODE's.

Laplace Transform:
• Definition.
• Applications in Differential Equations.

Fourier Series:
• Convergence.
• Fourier Integral.

Partial Differential Equations.
• Classifications.
• Laplace Equation.
• Wave and Heat Equations.
• The Method of separation of Variables.

Evaluation Strategies:
• 1st Exam 20%
• 2nd Exam 20%
• Quizzes and Homework 10%
• Final Exam 50%

Learning Resources:
• Calculus, BY Howard Anton, 6th edition 1999.