

**NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
MTH 272 - APPLIED CALCULUS II (3 CR.)**

Course Description

Covers techniques of integration, multivariable calculus, and an introduction to differential equations.

Lecture 3 hours per week.

General Course Purpose

The purpose of this course is to provide the student with majors in business, social science, or biology with a one year sequence in calculus developed with a minimum of mathematical rigor and applications suitable for these majors are emphasized. This sequence is not appropriate for the student with majors in mathematics, engineering, or the physical sciences. Current technology is incorporated in this course.

Course Prerequisites/Co-requisites

Prerequisite: MTH 271 - "Applied Calculus I".

Credit will not be awarded for both MTH 173 and MTH 272.

Course Objectives

As a result of the learning experience in this course, the student should be able to:

- A. find anti-derivatives of algebraic, exponential, and logarithmic functions using the techniques of substitution, integration by parts, and tables,
- B. apply anti-derivatives and definite integrals to the solution of problems,
- C. solve differential equations with variables separable,
- D. sketch three dimensional surfaces,
- E. find partial derivatives and apply them to solve maximum and minimum problems in three dimensions,
- F. evaluate multiple integrals and apply them,
- G1. find and use Taylor polynomials to approximate functions,
or
- G2. find derivatives and integrals of the trigonometric functions.

Major Topics To Be Included

- A. Integration Techniques
 - 1. Substitution
 - 2. Integration by parts
 - 3. Use of tables
- B. Applications of the Integral
 - 1. Area between two curves
 - 2. Density functions; improper integrals
 - 3. Economics
 - 4. Life Sciences
- C. Introduction to Differential Equations
 - 1. Notation
 - 2. Variables separable
- D. Functions of Two Variables
 - 1. Limits and Continuity

2. Graphs
3. Partial Differentiation
4. Maxima and Minima (absolute and local)
5. Extrema subject to constraints (Lagrange Multipliers)
6. Multiple Integrals

One of the following two topics is to be covered, at the discretion of the instructor.

E1. Trigonometric functions

1. Definitions and identities
2. Graphs of the trigonometric functions
3. Derivatives of the trigonometric functions
4. Integrals of the trigonometric functions

E2. Taylor Polynomials and Series

1. Sequences
2. Series and convergence
 - a. Definition of infinite series
 - b. Test for divergence
 - c. Review of geometric series
3. Power series and Taylor's Theorem
 - a. Definition of power series
 - b. Interval of convergence of a power series
 - c. Ratio Test
 - d. Taylor's Theorem
4. Taylor Polynomials
 - a. Taylor's remainder theorem
 - b. Approximating functions
 - c. Integration and differentiation of Taylor polynomials
5. Newton's Method