Calculus

Course # DMNS 1006

Credits 6

Pre-requisites and Co-requisites: Precalculus

Course Description

Calculus is a foundational course at UCA. This introductory calculus course covers differentiation and integration of functions with applications. The course is designed in a way that provides students with a thorough grounding in concepts and applications, analytical techniques, and numerical methods of Calculus.

In this course, students study mathematics that deals with the precise definition of a limit, limits graphically and algebraically, infinite limits and limits at infinity, continuity and one sided limits, basic differentiation rules and rates of change, Implicit differentiation, applications of derivative, computing indefinite integrals, the Fundamental Theorem of Calculus, techniques of integration, applications of integrals, logarithmic differentiation, inverse functions and derivatives of inverse functions, exponential functions, using exponential and logarithmic functions to model compound interest, exponential growth and decay, functions of several variables and their applications.

Course Learning Outcomes

Upon completion of the course, students are expected to be able to:

- Compute limits and derivatives of algebraic, trigonometric, and piece-wise defined functions.
- Compute definite and indefinite integrals of algebraic and trigonometric functions using formulas and substitution.
- Use the derivative of a function to determine the properties of the graph of the function and use the graph of a function to estimate its derivative.
- Estimate a propagated error using a differential.
- Solve problems in a range of mathematical applications using the derivative or the integral.
- Determine the continuity and differentiability of a function at a point and on a set.
- Determine whether a function has an inverse function. Find the derivative of an inverse function.
- Use exponential and logarithmic functions to model compound interest, exponential growth and exponential decay.
- Solve optimization problems involving functions of several variables.

Course Assessments and Grading

Item	Weight
Attendance	5%
Test 1 on independent work	10%
Test 2 on independent work	12%
Midterm exam	25%
Test 3 on independent work	10%
Test 4 on independent work	13%
Final exam	25%