Calculus and Analytical Geometry

Code	**Credit Hours**
MATH- 101	3-0

Course Description

The course reviews the concepts of basic calculus, including Limits, continuity, differentiation and integration. A brief account of three-dimensional geometry is also included as pre-calculus review. Stress is laid on applications of differentiation and integration to practical/engineering problems. Convergence/divergence of the sequence and series are included towards the end of the syllabus.

Text Books:

1. Thomas Calculus (14th Edition) by George B. Thomas, Joel R. Hass, Christopher Heil, Maurice D. Weir
2. Calculus (6th Edition) by Swokowski, Olinick and Pence.

Reference Books:

1. Calculus (10th Edition) by Howard Anton, Irl C. Bivens, Stephen Davis
2. Real and Complex Analysis by Walter Rudin.
3. Calculus (3rd Edition) by Robert T. Smith & Roland B. Minton.

Prerequisites

Nil

ASSESSMENT SYSTEM FOR THEORY

Quizzes	10%
Assignments	10%
Mid Terms	30%
ESE	50%

Teaching Plan

Week No	Topics	Learning Outcomes
1	Introduction	Course Outline, objectives, teaching plan, assessment method, Review of functions and their graphs
2-6	Limits, Continuity and Differentiation	Limits & continuity, techniques of finding limits, Techniques of differentiation, Tangent lines and rates of change, Extrema of functions, Rolle's and Mean value theorems, Concavity, Indeterminate forms and L'Hopital's rule
7-8	Integration and its Applications	Riemann sum, definite integrals and properties of integrals, Solids of revolution, volume of solids of revolution by Cylindrical shell and Cross section methods
9	**MID TERM EXAM**	
10-11	Integration and its Applications	Arc length, surface of revolution, Center of mass, Trigonometric and Improper Integrals
12-16	Sequence and Series.	Convergence and divergence of sequences and series, positive term series, integral test, Basic comparison test, limit comparison test, the ratio and root tests, alternating series, absolute and conditional convergence, Power series, Maclaurin and Taylor series
17	Vectors and 3D-coordinate system	Review of vectors, scalars and vector products. Three-dimensional coordinate system and equation of straight line and plane
18	**End of Semester**	