SIDDHARTHA
ACADEMY OF HIGHER EDUCATION
An Institution DEEMED TO BE UNIVERSITY
(Under Section 3 of UGC Act, 1956)
Kanuru, Vijayawada - 520 007, AP. www.vrsiddhartha.ac.in

24MA101 - LINEAR ALGEBRA, SERIES AND CALCULUS

COMMON TO ALL BRANCHES

(AI&DS/AI&ML/CE/CSE/ECE/EEE/EIE/IT/ME)

COURSE OUTCOMES	
Upon successful completion of the course, the student will be able to:	
CO1	Solve the systems of equations and analyze engineering problems using linear algebra techniques [K3]
CO2	Apply the convergence tests of an infinite series to solve engineering problems [K3]
CO3	Use differential calculus to solve optimization problems and analyze rates of change in engineering applications [K3]
CO4	Calculate areas and volumes using double and triple integrals[K3]
CO5	Apply vector calculus concepts to solve problems involving work done by force fields and analyze related physical phenomena [K3]

COURSE CONTENT

UNIT I - Linear Algebra **[T2]**

Rank of a matrix (Echelon form), Finding the inverse by Gauss-Jordan method,Systemof linear equations: Homogeneous and Non-Homogeneous, Linear transformations, Orthogonal transformation, Eigenvalues and Eigenvectors, Reduction to Diagonal form

UNIT II - Infinite Series **[T2]**

Infinite Sequence (Definition), Infinite Series, Comparison Tests, Integral Test, Ratio and Root Test, Alternating Series, Absolute and Conditional convergence

UNIT III - Differential Calculus **[T2]**

Mean value theorems: Rolle's theorem (without proof),Lagrange's mean value theorem (without proof),Taylor's and Maclaurin's theorems with Lagrange's form of remainder(without proof), Expansions of functions: Taylor's and Maclaurin's series

Functions of Several Variables: Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers

UNIT IV - Multiple Integrals **[T2]**

Double integrals (Cartesian coordinates), Change of order of integration, Triple integrals, Change of variables to polar, cylindrical and spherical coordinates, Areas as double integration and Volumes as triple integration.

Unit V - Vector Calculus **[T2]**

Introduction to Gradient of a scalar field, Divergence and Curl of a vector field, Line integral, Green's theorem in the plane (without proof), Surface integrals, Stoke's theorem (without proof) and Gauss divergence theorem (without proof).

TEXT BOOKS

[1]. Weir Maurice D., Hass Joel & Giodano Frank R. (2013). Thomas' Calculus. (11th Edition). Pearson Education, inc..
[2]. Grewal B. S. (2017). Higher Engineering Mathematics. (44th Edition). Khanna Publishers.

REFERENCE BOOKS

[1]. Kreyszig Erwin. (2013). Advanced Engineering Mathematics.(9th Edition).Wiley Publishers.
[2]. Ramana B.V.(2007). Higher Engineering Mathematics.Tata Mc.Graw Hill.