Title: MATH-243 - Vector Calculus Course Code: 3-0 CHs

Text Book: a. E. Kreyszing, Advanced Engineering mathematics (9th edition)
b. Swokowski, Onlinick & Pence: Calculus (6th Edition)

Reference Book: Borisenko & Taranov, Vector and Tensor Analysis with Applications.

Course Objectives: To develop understanding Vector Calculus and Partial Differential Equations.

Assigned PLO	Course Learning Outcomes CLOs	Level of Learning	PLO
1, 2	CLO1. Work out equation of lines, planes, surfaces and parametric curves.	C3	1
	CLO2. Evaluating divergence and curl of vector fields	C5	1
	CLO3. Understanding problems of surface and curve integrals	C2	2
	CLO4. Understand and solve the analytic solutions of Heat, Wave and Laplace equations	C3	2

Sr. No	Topics	Estimated Contact Hours
1	Analytical Geometry in 3-space	3
2	Quadratic Surfaces	2
3	Cylindrical and Spherical coordinates	1
4	Parametric representation of curves, Arc length Curvature & Torsion	5
5	Gradient of a Scalar Field and directional derivatives	3
6	Divergence of a Vector Field.	2
7	Curl of a Vector Field.	2
8	Line integral, integration around closed curves.	3
9	Application of double integrals, Green's theorem.	3
10	Surface Integrals.	3
11	Triple integrals, Divergence theorem of Gauss.	3
12	Stokes's theorem.	3
13	Partial differential equations solvable as ODEs (separation of variables)	3
14	Modeling a Vibrating String, Derivation of Wave Equation	3
15	Solution by the Method of Separation of Variables using Fourier Series.	3
16	Heat Equation; its Solution by Fourier Series.	3