

SEMESTER- III
DIFFERENTIAL AND VECTOR CALCULUS
Theory: 5 hours /week and Tutorials: 1 hour /week

DSC-III

Objective: The course is aimed at exposing the student to some basic notions in Differential Calculus.

Outcome: After the completion of the course the student realizes wide-ranging applications of the subject.

UNIT- I

Partial Differentiation: Introduction - Functions of Two Variables - Neighbourhood of a Point (a, b) - Continuity of a Function of Two Variables- Continuity at a Point - Limit of a Function of Two Variables - Partial Derivatives - Geometrical Representation of a Function of Two Variables - Homogeneous Functions. (Text Book 1 : 11.1 to 11.8)

UNIT- II

Theorem on Total Differentials-Composite Functions- Differentiation of Composite Functions- Implicit Functions- Equality of $f_{xy}(a, b)$ and $f_{yx}(a, b)$, Taylor's Theorem for a Function of Two Variables- Maxima and Minima of Function of Two variables- Lagrange's Method of Undetermined Multipliers (Text Book 1 : 11.9 to 11.11 & 9.6, 9.7)

UNIT- III

Gradient, Divergence and Curl : Introduction-Gradient- Divergence-Curl -Formulas Involving ∇ - Invariance (Text Book 2: Chapter 4: 4.1 to 4.6)

Multiple Integrals : Double Integrals- Double Integrals in Polar Form (Book 3: 13.1 & 13.3)

Vector Integration : Introduction- Ordinary Integrals of Vector Valued Functions - Line Integrals-Surface Integrals- Volume Integrals. (Text Book 2: Chapter 5: 5.1 to 5.5)

UNIT- IV

The Divergence Theorem, Stoke's Theorem and Related Integral Theorems : Introduction-Main Theorems- Related Integral Theorems (Text Book 2: Chapter 6: 6.1 to 6.3)

TEXT BOOKS:

1. Shanti Narayan, P.K. Mittal Differential Calculus, S.CHAND, NEW DELHI, Fifteenth Edition
2. Vector Analysis , Second Edition (Schaum's Outlines) , By Murray R. Spiegel, Seymour Lipschutz, Dennis Spellman.
3. Calculus and Analytical Geometry by George B. Thomas, Ross. L. Finney (Ninth Edition)

REFERENCE BOOKS:

1. William Anthony Granville, Percy F Smith and William Raymond Longley; Elements of the Differential and Integral Calculus
2. Joseph Edwards, Differential calculus for Beginners
3. Smith and Minton, Calculus
4. Elis Pine, How to Enjoy Calculus

