

MATHEMATICS – III
(LINEAR ALGEBRA & VECTOR CALCULUS)
(Common to All Branches)

UNIT I Linear systems of equations:

Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination - Gauss Jordan and Gauss Seidal Methods.

Application: Finding the current in a electrical circuit.

Subject Category

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UNIT II Eigen values - Eigen vectors and Quadratic forms:

Eigen values - Eigen vectors– Properties – Cayley-Hamilton Theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem- Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - index – signature.

Application: Free vibration of a two-mass system.

Subject Category

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UNIT III Multiple integrals:

Review concepts of Curve tracing (Cartesian - Polar and Parametric curves)-

Applications of Integration to Lengths, Volumes and Surface areas of revolution in Cartesian and Polar Coordinates.

Multiple integrals - double and triple integrals – change of variables – Change of order of Integration

Application: Moments of inertia

Subject Category

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UNIT IV Special functions:

Beta and Gamma functions- Properties - Relation between Beta and Gamma functions- Evaluation of improper integrals

Application: Evaluation of integrals

Subject Category

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UNIT V Vector Differentiation:

Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities

Application: Equation of continuity, potential surfaces

Subject Category

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UNIT VI Vector Integration:

Line integral – work done – Potential function – area- surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence Theorems (Without proof) and related problems.

application: work done, Force

Subject Category

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BOOKS:

1. **GREENBERG**, Advanced Engineering Mathematics, 9th Edition, Wiley-India
2. **B.V. RAMANA**, Higher Engineering Mathematics, Tata McGrawhill
3. **ERWIN KREYSZIG**, Advanced Engineering Mathematics, 9th Edition, Wiley-India
4. **PETER O'NEIL**, Advanced Engineering Mathematics, Cengage Learning
5. **D.W. JORDAN AND T. SMITH**, Mathematical Techniques, Oxford University Press