I Year-II Semester		L	T	P	C
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MATHEMATICS-III (R13202)

Prerequisite Course: Basic knowledge of Matrix operations

Course Description and Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
3. Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes.

CO	Course Outcomes	POs
1	Determine rank of a given matrix and Solve simultaneous linear equations	5
2	Determine Eigenvalues and Eigen vectors of a given matrix.	6
3	Determine double integral over a region and triple integral over a volume.	3
4	Evaluating improper integrals by using beta and gamma functions.	3
5	Calculate gradient of a scalar function, divergence and curl of a vector function.	4
6	Determine line, surface and volume integrals. Apply Green, Stokes and Gauss divergence theorems to calculate line, surface and volume integrals.	4

Syllabus:

UNIT I:

Linear systems of equations:

Rank-Echelon form-Normal form – Solution of linear systems – Direct Methods-Gauss elimination – Gauss Jordon and Gauss Seidal methods.
Application: Finding the current in a electrical circuit.

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.

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

UNIT IV:

Special functions:

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

UNIT V: Vector Differentiation:

Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities.
Application: Equation of continuity, potential surfaces

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.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. B.S.Grewal, Higher Engineering Mathematics,42nd Edition, Khanna Publishers.
2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.
3. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
4. Dass H.K., Rajnish Verma. Er**.,** Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.