

JAWAHARLAL NEHRUTECHNOLOGICALUNIVERSITY:KAKINADA

KAKINADA-533003, Andhra Pradesh, India

R-13 Syllabus for ME.JNTUK

I Year-II Semester	L	T	P	С
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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	4
U	divergence theorems to calculate line, surface and volume integrals.	

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.

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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

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.