

I Year – II SEMESTER

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3+1	0	3

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 Jordon and Gauss Seidal Methods.

Application: Finding the current in a electrical circuit.

Subject Category

ABET Learning Objectives a e k

ABET internal assessments 1 2 6 4

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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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ABET internal assessments 1 2 6

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BOOKS:

1. **GREENBERG**, Advanced Engineering Mathematics, 9th Edition, Wiley-India.
2. **B.V. RAMANA**, Higher Engineering Mathematics, Tata Mc Grawhill.
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.

Subject Category	ABET Learning Objectives	ABET Internal Assessments	JNTUK External Evaluation	Remarks
Theory Design Analysis Algorithms Drawing Others	a) Apply knowledge of math, science, & engineering b) Design & conduct experiments, analyze & interpret data c) Design a system/process to meet desired needs within economic, social, political, ethical, health/safety, manufacturability, & sustainability constraints d) Function on multidisciplinary teams e) Identify, formulate, & solve engineering problems f) Understand professional & ethical responsibilities g) Communicate effectively h) Understand impact of engineering solutions in global, economic, environmental, & societal context i) Recognize need for & be able to engage in lifelong learning j) Know contemporary issues k) Use techniques, skills, modern tools for engineering practices	1. Objective tests 2. Essay questions tests 3. Peer tutoring based 4. Simulation based 5. Design oriented 6. Problem based 7. Experiential (project based) based 8. Lab work or field work based 9. Presentation based 10. Case Studies based 11. Role-play based 12. Portfolio based	A. Questions should have: B. Definitions, Principle of operation or philosophy of concept. C. Mathematical treatment, derivations, analysis, synthesis, numerical problems with inference. D. Design oriented problems E. Troubleshooting type of questions F. Applications related questions G. Brainstorming questions	