

## JAWAHARLAL NEHRUTECHNOLOGICALUNIVERSITY:KAKINADA

## KAKINADA-533003, Andhra Pradesh, India

R-16 Syllabus for ECE.JNTUK

I Year-II Semester	L	T	P	С
1 Year-11 Semester	4	0	0	3

# **MATHEMATICS-III (R161203)**

**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 – Gauss elimination - Gauss Jordon-Gauss Jacobi and Gauss Seidal methods.

Applications: Finding the current in electrical circuits.

#### 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- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form - Rank - Positive, negative and semi definite - Index - Signature.

Applications: Free vibration of a two-mass system.

#### **UNIT III:**

## **Multiple integrals:**

Curve tracing: Cartesian, Polar and Parametric forms.

Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration.

Applications: Finding Areas and Volumes.

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## **UNIT IV: Special functions:**

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

Applications: Evaluation of integrals.

#### **UNIT V: Vector Differentiation:**

Gradient- Divergence- Curl - Laplacian and second order operators - Vector identities. Applications: 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. Applications: Work done, Force.

#### **TEXT BOOKS:**

- 1. B.S.Grewal, Higher Engineering Mathematics, 43<sup>rd</sup> Edition, Khanna Publishers.
- 2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

#### **REFERENCE BOOKS:**

- Greenberg, Advanced Engineering Mathematics, 2<sup>nd</sup> edition, Pearson edn
  Erwin Kreyszig, Advanced Engineering Mathematics, 10<sup>th</sup> Edition, Wiley-India
- Peter O'Neil, Advanced Engineering Mathematics, 7<sup>th</sup> edition, Cengage Learning.
  D.W. Jordan and T.Smith, Mathematical Techniques, Oxford University Press.
- 5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
- 6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.