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| **B. TECH 2nd SEMESTER** | **L** | **T** | **P** | **C** |
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| **16MA2T01: Linear Algebra and Vector Calculus** | | | | |

**PREREQUISITES**

The two year intermediate course of Mathematics.

**COURSE OBJECTIVES**

1. To train the students for finding Rank **–**Echelon form, Normal form, and solution of liner systems – Direct Methods- Gauss Elimination, Gauss Jordon.
2. To train the student effectively how to find Eigen values, Eigen vectors and their properties.
3. To make the student to know the Cayley Hamilton Theorem-Applications: Finding Inverse and powers of a matrix by using Cayley-Hamilton theorem.
4. To evaluate many improper integrals easily by using Beta and Gamma functions.

**COURSE OUTCOMES**

The students are able to

1. apply the knowledge of matrices for solving linear system of equations
2. find the powers of the matrices by using Cayley Hamilton theorem.
3. apply the knowledge of evaluate improper integrals by using Beta and Gamma functions.
4. apply the knowledge of Vector Differentiation and Vector Integration in finding work done by a force.

**Syllabus:**

**UNIT I: Linear systems of equations**

Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination, Jacobi and Gauss Seidel Method.

**UNIT II: Eigen values - Eigen vectors**

Eigen values - Eigen vectors - Properties (without proof)-Cayley-Hamilton Theorem (without proof) Applications: Finding Inverse and powers of a matrix by using Cayley-Hamilton theorem.

**UNIT III: Special functions**

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

**UNIT IV: Multiple integrals**

Multiple integrals - Double and triple integrals - Change of variables - Change of order of Integration. Application: Applications of Integration to Lengths, Volumes and Surface areas of solids of revolution in Cartesian Coordinates.

**UNIT V: Vector Differentiation**

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

**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 by a force

**Text Books:**

1. **B.S. GREWAL,** Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **B.V. RAMANA,** Higher Engineering Mathematics, Tata McGraw Hill

**Reference books:**

1. ERWIN KREYSZIG, Advanced engineering Mathematics, 9th Edition, Wiley-India