



**Program:** BS(CS)-IV  
**Course Name:** Linear Algebra  
**Course Code:** MT-411  
**Credit Hours:** 03  
**Course Week:** 16  
**Total Hours:** 48

### Course Objectives

This course is designed for the students so that they can use techniques and concepts of linear algebra in practical problems. This course will give them complete knowledge of matrices and determinants and their application in computer related problems. They will get a complete idea of different spaces (2-space, 3-space and n-space). They will also have knowledge of vector products and will be able to apply it practically.

#### **Week-1**

- Introduction to system of linear equation.

#### **Week-2**

- Solution of system of linear equation by Gaussian elimination  
And Gauss Jordan Elimination.
- Solution of homogeneous system of linear equations.

#### **Week-3**

- Matrices and Matrix operations.
- Transpose of Matrices.
- Invertible Matrices.
- Diagonal, triangular and symmetric Matrices.

#### **Week-4**

- Properties of inverses
- Methods to find inverse of a Matrix.

#### **Week-5**

- Introduction to Determinant.
- Finding inverse by ad joint method.

#### **Week-6**

- Cramer's Rule for solution of system of linear equations.

#### **Week-7**

- Introduction to vectors in 2-space
- Properties of vector operation
- Dot Product of vectors

**Week-8**

- Angle between 2 vectors
- Cross product of vectors
- Scalar triple product

**Week-9**

- Lines and planes in 3-space

**Week-10**

- Euclidean n-space
- Linear transformation from  $\mathbb{R}$  to  $\mathbb{R}$

**Week-11**

- Real Vector Space

**Week-12**

- Subspace

**Week-13**

- Linear Independence Basis and Dimensions

**Week-14**

- Inner Product Space, Unit circle and Spheres in inner products

**Week-15**

- Eigen values and Eigen vectors.

**Week-16**

- Presentations

**Total Marks: 100**

**Recommended Books**

1. ELEMENTARY LINEAR ALGEBRA (APPLICATIONS VERSION), Howard Anton, Chris Rorres