Course Structure

| Course Code | BCA10050 | | | | |
|---|---|---|---|---|---|
| Course Category | Program Foundation | | | | |
| Course Title | Linear Algebra | | | | |
| Teaching Scheme | Lectures | Tutorials | Laboratory/Practical | Project | Total |
| Weekly Load Hrs. | 2 | - | | | 2 |
| Credits | 2 | - | | - | 2 |
| Assessment Schema Code | TT1 | | | | |

**Course Objectives:**

This course provides an introduction to linear algebra topics. Emphasis is placed on the development of abstract concepts and applications for vectors, systems of equations, matrices, determinants, vector spaces, multi-dimensional linear transformations, eigenvectors, eigenvalues, diagonalization and orthogonality.

**Course Outcomes:**

After the completion of this course students will

1.Use analytical and graphical representations to apply vector operations in multiple dimensions.

2. Solve systems of linear equations using multiple manual and technology-based methods; these methods will include but are not limited to Gaussian and Gauss-Jordan.

3. Use eigenvalues, eigenvectors and diagonalization to solve problems in appropriate situations. 4. Use matrix operations and linear transformations to solve problems in appropriate situations.

**Course Contents:**

**Unit 1: Matrix Algebra [6]**

- Matrix Operations ,
- The Inverse of a Matrix
- Characterizations of Invertible Matrices ,
- Determinants

**Unit 2: Systems of Linear Equations [6]**

- Row Reduction and Echelon Forms
- Vector equations
- The Matrix equation Ax = b
- Solution Sets of Linear Systems
- Applications of Linear Systems
- Linear Independence
- Linear Transformations. Applications of linear transformation
- Linear Models

**Unit 3: Vector Spaces [6]**

- Vector Spaces and Subspaces
- Null, Column, and Row Spaces
- Basis
- Coordinate Transformations
- Dimension; Rank of a Matrix

**Unit 4: Eigenvalues and Eigenvectors [6]**

- Eigenvalues and Eigenvectors
- The Characteristic Equation
- Diagonalization
- Applications Quadratic forms

**Unit 5: Orthogonality [6]**

- Inner Product, Length, and Orthogonality
- Orthogonal Sets
- Orthogonal Projections

**Learning Resources:**

**Text Books/Reference Books::**

Elementary Linear Algebra by Stanley I. Grossman.

Introduction to Linear Algebra by SERGE LANG, Springer Verlag

Linear Algebra A Geometric Approach by S. KUMARESAN, Prentice Hall of India Private Limited

**Web Resources**

**Weblinks:**

**Pedagogy:**

- Participative Learning,
- Discussion
- Demonstrations
- Practical
- Assignment