

Semester-IV

Subject Code	Subject Name	Core/ Elective	L-T-P	Credits
BS	Linear Algebra	C	3-0-0	3

Course Objectives:

1. To emphasize the topics that will be useful in other disciplines, including systems of equations, vector spaces, determinants, eigenvalues, similarity, and positive definite matrices.
2. To make students understand the central ideas of linear algebra like solving linear equations performing matrix algebra, calculating determinants, finding eigenvalues and eigenvectors

Course Outcomes:

At the end of the course, student will be able to

- 1 Solving systems of linear equations is a basic tool of many mathematical procedures used for solving problems in science and engineering
- 2 The main aim of this course is to make students understand the central ideas of linear algebra like solving linear equations
- 3 performing matrix algebra, calculating determinants, finding eigenvalues and eigenvectors

UNIT I

(15 hours)

Vector Space: Elimination, LU factorization, null-spaces and other subspaces, bases and dimensions, vector spaces, complexity

UNIT II

(16 hours)

Factorization: Orthogonality, projections, least-squares, QR, Gram-Schmidt, orthogonal functions

UNIT III

(15 hours)

Matrices: Eigenvectors, determinants, similar matrices, Markov matrices, ODEs, symmetric matrices, definite matrices,

UNIT IV

(17 hours)

Iterative methods: Defective matrices, SVD and principal-components analysis, sparse matrices and iterative methods, complex matrices, symmetric linear operators on functions.

UNIT V

(12 hours)

Applications: Matrices from graphs and engineering.

Textbooks:

1. G. Strang, Linear Algebra and Its applications, Nelson Engineering, 4th Edn., 2007
2. K. Hoffman and R. Kunze, Linear Algebra, Prentice Hall of India, 1996

Reference Books:

1. S. Axler, Linear Algebra Done Right, 2nd Edn., UTM, Springer, Indian edition, 2010.
2. G. Schay, Introduction to Linear Algebra, Narosa, 1997.