

**LINEAR ALGEBRA**

**UNIT I**

Systems of linear Equations – Matrices and Elementary Row operations – Row - Reduced echelon Matrices – Matrix Multiplication – Invertible Matrices – Vector spaces – Subspaces – Bases and Dimension – Computations concerning Subspaces.

**UNIT II**

The algebra of linear transformations – Isomorphism of Vector Spaces – Representations of Linear Transformations by Matrices - Linear Functionals - The Double Dual – The Transpose of a Linear Transformation.

**UNIT III**

The algebra of polynomials – Lagrange Interpolation – Polynomial Ideals – The prime factorization of a polynomial, Commutative rings – Determinant functions – Permutations and the uniqueness of determinants – Classical Adjoint of a (Square) matrix – Inverse of an invertible matrix using determinants.

**UNIT IV**

Characteristic values – Annihilating polynomials, Invariant subspaces – Simultaneous triangulation and simultaneous Diagonalization – Direct-sum Decompositions.

**UNIT V**

Invariant Direct sums – The Primary Decomposition Theorem – Cyclic subspaces – Cyclic Decompositions and the Rational Form.

**TEXT BOOK(S)**

Kenneth Hoffman and Ray Kunze, Linear Algebra, Second Edition, Prentice – Hall of India Private Limited, New Delhi :1975.

UNIT – I	-	Chapters 1 and 2
UNIT – II	-	Chapter 3
UNIT – III	-	Chapter 4 and Chapter 5: Sections 5.1 to 5.4
UNIT – IV	-	Chapter 6: Sections 6.1 to 6.6
UNIT – V	-	Sections 6.7 and 6.8 and Chapter 7: Sections 7.1 to 7.4

**REFERENCE(S)**

- [1] I.N. Herstein, Topics in Algebra, Wiley Eastern Limited, New Delhi, 1975.
- [2] I.S. Luther and I.B.S. Passi, Algebra, Vol.I – Groups, Vol.II- Rings, Narosa Publishing House (Vol.I – 1996, Vol.II- 1999)
- [3] N. Jacobson, Basic Algebra, Vols. I & II, Freeman, 1980 (also published by Hisdustan Publishing Company)