

Introduction to linear equations, matrices, inverses. Vector spaces (VS), subspaces, linear independence, span, column space, row space, null space, basis, and dimension, Gaussian elimination, LU-Decomposition. [8]

Linear transformations, matrix of a linear transformation, change of basis, similarity, determinants. Computation of null space, rank, rank-nullity theorem and its applications. [7]

Eigenvalues, eigenvectors, characteristic polynomials, minimal polynomials, Cayley-Hamilton theorem, triangulation, algebraic multiplicity, geometric multiplicity, diagonalization and its different characterizations, rational canonical form, Jordan canonical form. [10]

Inner product VS, Gram-Schmidt process, eigenvalues for various types of matrices. [5]

Applications to differential equations. [5]

**TEXT BOOKS:**

1. **Gelbart Strang**, Linear algebra and its applications (4th Edition), Thomson (2006).
2. **S. Kumaresan**, Linear algebra - A Geometric approach, Prentice Hall of India (2000).

**REFERENCE BOOKS:**

1. **Edgar G. Goodaire**, Linear Algebra-Pure & Applied, Cambridge University Press, 2014.
2. **David C. Lay**, Linear Algebra and it's Applications, Pearson Education, 2012.