

Linear Algebra:

Real Vector spaces, subspaces, Linear independence, Basis and dimension, Row space, column space and Null space, Rank and Nullity. Inner products spaces: Inner product, angle and Orthogonality, Orthonormal bases, Gram Schmidt process, Best approximation and Least squares approximations.

General linear transformations, kernel and range, Inverse linear transformations, Matrices of general linear transformations.

Graph Theory:

Graphs, subgraphs, degrees, isomorphism, adjacency and incidence matrices, , walks, Euler graph. Connected graphs, shortest path algorithm. Graph connectivity, k-connected graphs and blocks, network flow algorithm. Trees, spanning trees, minimum spanning trees algorithms (Kruskal and Prims algorithms), DFS and BFS algorithms.

Planar graphs, Euler formula for Planar graphs, vertex colorings and Chromatic polynomials. Matching, maximal matchings and Independent sets.

TEXT BOOKS/ REFERENCES:

1. Gilbert Strang, *Linear Algebra and its Applications*, Fourth Edition, Cengage Learning, 2006.
2. David C. Lay, Steven R. Lay and Judy J. Mc Donald, *Linear Algebra and its Applications*, Fifth Edition, Pearson, 2014.
3. Anton, Howard. *Elementary Linear Algebra*. John Wiley & Sons, 2010.
4. Adrian Bondy and Murty, *Graph Theory with Applications*, 2008, Springer
5. D. B. West, *Introduction to Graph Theory*, Second Edition, Prentice Hall, 2001.