

Course Outline

Lecture Topics (14 Lectures) :

- Vector Operations,, Norms, Distances
- Clustering, Linear Dependence, Basis, Orthogonality
- Matrices, Matrix -Vector Product, Matrix Applications
- Matrix Inverses , Solving Linear Equations, Projection Spaces
- Least Squares, Data Fitting, Classification
- Eigen Analysis, PCA, Positive/Negative Definiteness
- Singular Value Decomposition and Applications
- Introduction to Functions, Derivatives and Matrix Calculus
- Convex Functions and Optimization Problems
- Optimality Criteria, Equivalent Convex Problems
- Lagrange Duality, Complementary Slackness, KKT conditions
- Constrained Optimization , Application to PCA
- Un-constrained Optimization, Gradient Descent Methods

Texts:

1. Introduction to Applied Linear Algebra, *Stephen Boyd & Lieven Vandenberghe*
2. Convex Optimization, *Stephen Boyd*

References:

Linear Algebra, Gilbert Strang

Evaluation Scheme – Part 1

Total (50)	
25 Marks	Mid-term Exam (Multiple Choice, 25 Questions of 1 mark each)
10 Marks	Assignment 1 (Pen and Paper) (Will be floated in week -4)
10 Marks	Assignment 2 (Pen and Paper) (Will be floated in week -6)
5 Marks	Attendance + Class Participation(Polls)