National University of Computer & Emerging Sciences

Question List for Linear Algebra

Book: Linear Algebra & its Applications (4th Edition) by David C Lay

FAST School of Computing

Chapter #	Topics	Related Qestions
1	Introduction to Linear Algebra? Why it is important to study linear algebra for CS students? System of Linear Equations. Solution of Linear Equation. Consistent & Inconsitent Systems. Coefficient Matrix & Augmented Matrix.	Exercise 1.1 Question # 1-25, 29- 3
1	Elementary Row Operations, Echelon Form (Guass Elemination Method), Reduced Echelon form (Guass Jorden Method)	Exercise1.2 Question # 1-20
1	Vector Equation	Exercise1.3 Question # 1-23, 25-26
1	Matrix Equation	Exercise1.4 Question # 1-27
1	Solution Set of Linear System	Exercise1.5 Question # 1-40
1	Application of Linear Equations	Exercise1.6 Question # 1-9,12-15
1	Linear Independence	Exercise1.7 Question # 1-40
1	Introduction to Linear Transformation	Exercise1.8 Question # 1-36
1	Matirx of Linear Transformation	Exercise1.9 Question # 1-36
2	Matrix Operation	Exercise 2.1 Question # 1-28
2	The Inverse of a Matrix	Exercise 2.2 Question # 1-35, 37-38
2	Characterizations of Invertible Matrices	Exercise 2.3 Question # 1-40
2	Partitioned Matrix	Exercise 2.4 Question # 1-13
2	Subspaces of $\mathbb{R}^n$	Exercise 2.8 Question # 1-36
2	Dimension and Rank	Exercise 2.9 Question # 1-25
3	Determinants	Exercise 3.1 Question # 1-37, 41-42
3	Properties of Determinants	Exercise 3.2 Question # 1-43
3	Cramer's Rule	Exercise 3.3 Question # 1-31
4	Vector Spaces & Subspaces	Exercise 4.1 Question # 1-28, 33
4	Null Spaces,Column Spaces and Linear Transformation	Exercise 4.2 Question # 1-33
4	Linearly Independent Sets: Bases	Exercise 4.3 Question # 1-31
4	Coordinate System	Exercise 4.4 Question # 1-17, 27-32, 33-34
4	Column Space & Null Spaces	Exercise 4.5 Question # 1-24
4	Dimensions & Ranks	Exercise 4.6 Question # 1-30
4	Change of Basis	Exercise 4.7 Question # 1-16
5	Eigenvectors and Eigenvalues	Exercise 5.1 Question # 1-33
5	The Characteristic Equation	Exercise 5.2 Question # 1- 27
5	Diagonalization	Exercise 5.3 Question # 1-32
5	Eigenvectors and Linear Transformations	Exercise 5.4 Question # 1-29
5	Complex Eigenvalues	Exercise 5.5 Question # 1-21
5	Discrete Dynamical Systems	Exercise 5.6 Question # 1-15
5	Applications to Differential Equations	Exercise 5.7 Question # 1-14

Chapter #	Topics	Related Qestions
6	Inner Product, Length, and Orthogonality	Exercise 6.1 Question # 1-18
6	Orthogonal Sets	Exercise 6.2 Question # 1-22
6	Orthogonal Projections	Exercise 6.3 Question # 1-22
6	The Gram- Schmidt Process	Exercise 6.4 Question # 1-12
7	Diagonalization of Symmetric Matrices	Exercise 7.1 Question # 1-26
7	Quadratic Form	Exercise 7.2 Question # 1-14
7	Constrained Optimization	Exercise 7.3 Question # 1-11
7	Singular Value Decomposition	Exercise 7.4 Question # 1-20

Weightage Distribution(approximate) of Final Exam (100 marks)

Chapter 1	Linear Equations in Linear Algebra	10%
Chapter 2	Matrix Algebra	5%
Chapter 3	Determinants	7%
Chapter 4	Vector Spaces	15%
Chapter 5	Eigenvalues and Eigenvectors	15%
Chapter 6	Orthogonality and Least Squares	24%
Chapter 7	Symmetric Matrices and Quadratic Forms	24%

Note:

- Paper will contain of 9 with Question# 1 will have 15 parts (Short Q/A) and remaining with 2-4 parts
- Marking would be relative