King Fahd University of Petroleum & Minerals

Department of Mathematics and Statistics

Syllabus of MATH 280 (122)

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Course: MATH 280

Title: Introduction to Linear Algebra

Textbook: Elementary Linear Algebra, 6th ed By Bernard Kolman

Objective: Understand the theory of Linear Algebra in:

- Linear systems and solutions of such systems.
- Special types and properties of matrices.
- Elementary matrices and their importance in proofs.
- Vector spaces, subspaces, linear dependence and independence, basis and dimension, coordinates, transition matrices, and the rank of a matrix.
- Linear transformations, the matrix of a linear transformation and similarity.
- Inner product spaces, Gram-Schmidt process.
- Determinants: Properties and applications.
- Eigenvalues, eigenvectors, diagonalization of symmetric matrices and real quadratic forms.

Week	Date	Section	Material
1	Jan 26- 30	1.1, 1.2	System of Linear equations, Matrix operation
2	Feb 2- 6	1.3, 1.4	Algebraic properties of matrix operations, Special types of matrices
3	Feb 9-13	1.5, 1.6	Echelon form of a matrix, Finding A^{-1}
4	Feb 16- 20	2.2, 2.3	Vector spaces- Subspaces
5	Feb 23-27	2.4, 2.5	Linear independence, Basis and dimension
6	Mar 2- 6	2.6, 2.7	Coordinates and isomorphisms, Homogeneous systems
7	Mar 9- 13	2.8, 3.1	The rank of a matrix, The standard inner product of R^2 and R^3
8	Mar 16- 20	3.3, 3.4	Inner product spaces, Gram-Schmidt process
Mid Term Vacation Mar 21 -29			
9	Mar 30 – Apr 3	4.1, 4.2	Definition of linear transformation, The kernel and range of a linear trans.
10	Apr 6- 10	4.3, 4.6	The matrix of a linear transformation, Similarity
11	Apr 13- 17	5.1, 5.2	Definition of a determinants, Properties of determinants
12	Apr 20- 24	5.3, 5.4	Cofactor expansion, The inverse of a matrix
13	Apr 27- May 1	5.5, 6.1	Other applications of determinants, Diagonalization
14	May 4- 8	6.1(cont'd.), 6.2	(cont'd.), Diagonalization of symmetric matrices
15	May 11- 15	6.2(cont'd.), 6.3	(cont'd.), Real quadratic forms