Linear Algebra

Code	Credit Hours
MATH-222	3+0

Course Description

The course reviews the basic concepts; including Matrices, Determinants, and linear system of equations. Stress is laid on vector spaces, inner product spaces and Eigenvalue problems with applications circuit analysis, computer graphics, control theory, and resonance and vibration theory of differentiation and integration to practical problems.

Text Book:

1. Advanced Engineering Mathematics, (9th Edition) by Erwin Kreyszig, John Wiley and Sons, inc 2006

Reference Book:

1. Introductory Linear Algebra (7th Edition) by B. Kolman, David R Hill Pearson Education (Singapore) 2003.
2. Introduction to Linear Algebra with applications by Daniel Gagliardi and Jim DeFranza.
3. Linear algebra with modern introduction by David Poole.
4. Linear Algebra with Applications (6th Edition) by Gareth Williams, Jones and Bartlett 2008.
5. Linear Algebra with applications by Steven J Leon.
6. Modern Engineering Mathematics by Glyn James.

Prerequisites

None

ASSESSMENT SYSTEM

Quizzes	10-15%
Assignments	5-10%
Mid Terms	25-35%
ESE	40-50%

Week No.	Topics
1	Introduction to Matrices: Addition, multiplication, Special Matrices and applications.
2	Linear System of Equations, Gauss Elimination, Row Echelon Form with application.
3	Solutions of Linear Systems: Existence, Uniqueness. Homogeneous and non-homogeneous Equations
4	Determinants and Crammer's Rule, Inverse of a Matrix, Gauss-Jordan Elimination, Determinant of Matrix Product.
5	Linear Systems: LU –Factorization, Solution of Linear Systems by LU-Factorization.
6	Applications of matrix algebra in computer science, Introduction of Vector space
7	Rank of a Matrix, Linear Dependence & Independence, Subspaces, Basis and Dimension.
8	Eigenvalues and Eigen Vectors. Applications of Eigenvalues and Eigen Vectors.
9	**Mid Semester Exam**
10	Symmetric, Skew Symmetric and Orthogonal Matrices.
11	Eigen-bases. Diagonalization. Quadratic Form
12	Complex Matrices and Forms: Hermitian, Skew-Hermitian and unitary matrices.
13	Linear Transformation and Matrices
14	The Kernel and Range of Linear Transformation
15	N-vectors, Vector Operations and Visualizing R3 with applications. Inner Product Spaces, norm of a vector
16	Inner Product Spaces, norm of a vector ,orthogonal vectors and inner product on Cn.Least Square Curves.
17	Least Square Curves.
18	**End Semester Exam**