

MTH280:LINEAR ALGEBRA

L:3 T:0 P:0 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: explain the concepts of matrices and determinant for solving linear system of equations.

CO2 :: understand the concepts of vector spaces and subspaces.

CO3 :: calculate basis and dimensions of finite dimensional vector spaces.

CO4 :: examine linear transformations for vector spaces and algebra of linear transformations.

CO5 :: relate matrices with linear transformations to find eigen values and vectors of linear transformations.

CO6 :: understand the inner product spaces and their properties.

Unit I

Matrices and system of linear equations : matrix algebra, determinants and its properties, inverse of a matrix, elementary operations on a matrix, row reduction echelon form, rank of a matrix, solution of linear system of equations

Unit II

Vector spaces : vector spaces, sub-spaces, linear combinations, linear span, linear independence/dependence of vectors, properties of vector spaces, algebra of subspaces, linear sum of two subspaces

Unit III

Base And Dimension : Basis of vector space. Definition, Finite-dimensional Vector spaces., Dimension of a finitely generated vector spaces., Dimension of subspace, Quotient space., Cosets

Unit IV

Linear transformations : linear transformations: definition and examples, null space, column space, rank and nullity of a linear transformation, matrix of a linear transformation, coordinates of linear transformation, change of basis

Unit V

Eigen values and eigen vectors with applications : definition of eigen value and eigen vector, characteristic polynomial, diagonalization, Cayley-Hamilton theorem, annihilating polynomial, minimal polynomial, diagonalization of linear operator

Unit VI

Inner product spaces with applications : inner product definition and examples, orthogonality, orthogonal sets, orthogonal projections, Gram-Schmidt orthogonalization process

Text Books:

1. LINEAR ALGEBRA AND ITS APPLICATIONS by DAVID C LAY, PEARSON

References:

1. LINEAR ALGEBRA by A.R.VASISHTHA, J.N. SHARMA, KRISHNA PUBLICATION
2. ELEMENTARY LINEAR ALGEBRA WITH APPLICATIONS by BERNARD KOLMAN, PEARSON

