BAPATLA ENGINEERING COLLEGE::BAPATLA
(Autonomous)

Linear Algebra

IV B.Tech   VII Semester18MA007

Lectures	:	4 Periods/Week	Credits - 3	Continuous Assessment	:	50
Final Exam	:	3 hours		Final Exam Marks	:	50

Pre-Requisite: None

Course Objectives: Students will learn how to

➤	Verify a vector Space, check for basis and find the rank.
➤	To le Findthe eigen values and eigven vectors, diagonalization of a square matrix and finding higher power of a given square matrix.
➤	Define an inner product inner product, orthogonal projections, Gram-Schmidt orthgonalization process, least square solution of a system.
➤	To learn diagonalization of symmetric matrices and singular value decomposition of a matrix.

Course Outcomes: After studying this course, the students will be able to

CO1	Apply the definition for verification of a vector space, Change of basis and finding dimension of a vector space
CO2	Find matrix representation of a transformation, eigen values, eigen vectors and diagonalization of a matrix and its power matrix
CO3	Use the knowledge for orthonormal basis. Method of least square to fit a polynomial for the given data
CO4	To diagonalize a symmetric matrix and singular value decomposition of a matrix.

Mapping of Course Learning Outcomes with Program Outcomes & Program Specific Outcomes

CO	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	3	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	3	-	-	-

UNIT-1	(12 Hours)

Vector Spaces:

Vector Space and Subspaces, Null Spaces, Column Spaces and Linear Transformations, Linear Independent Sets, Bases, The dimension of a vector space, Rank.

[Sections 4.1, 4.2, 4.3 4.5, and 4.6]

UNIT-2	(12 Hours)

Eigen Values and Eigen Vectors:

Eigen Vectors and Eigen values, The Characteristic Equation, Diagonalization, Eigen Vectors and Linear Transformations.

[Sections 5.1, 5.2, 5.3, and 5.4]

UNIT-3	(12 Hours)

Orthogonality and Least Squares:

Inner Product, Length, and Orthogonality, Orthogonal Sets, Orthogonal Projections, The Gram–Schmidt Process, Least-Squares Problems.

[Sections 6.1, 6.2, 6.3, 6.4 and 6.5]

UNIT-4	(12 Hours)

Symmetric Matrices and Quadratic Forms:

Diagonalization of Symmetric Matrices, Quadratic Forms, Constrained Optimization, The Singular Value Decomposition.

[Sections 7.1, 7.2, 7.3 and 7.4]

Text Books :	[1] Linear Algebra And Its Applications by David C. Lay, Steven R. Lay and Judi J. McDonald 5th edition, Pearson, 2016.
References :	[1] "Linear Algebra And Its Application" by Gilbert Strang, 4th edition, Cengage India Limited,2014.