VI SEMESTER B.E.

Linear Algebra (Open Elective)

Course Code: 17MAT661		**CIE Marks:** 40
Number of Lecture Hours/Week: 03		**SEE Marks:** 60
Total Number of Lecture Hours: 40		**Exam Hours:** 03
	CREDITS – 03	

Course objectives:

This course will enable students to:

- Represent a system in the form of linear equations.
- Find the solution of the system of linear equations using matrix operations.
- Identify vector spaces and subspaces.
- Transform a vector space of one dimension into another.
- Factorize a given matrix using different methods.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Linear Equations: Fields; system of linear equations, and its solution sets; elementary row operations and echelon forms; matrix operations; invertible matrices, LU-decomposition. (Text.2 Chap.1)	08 Hours	L2, L3, L4
Module -2		
Vector Spaces: Vector spaces; subspaces; bases and dimension; coordinates; summary of row-equivalence; computations concerning subspaces. (Text.1 Chap. 2)	08 Hours	L2, L3, L4
Module -3		
Linear Transformations: Linear transformations; algebra of linear transformations; isomorphism; representation of transformations by matrices; linear functional; inverse of a linear transformation. (Text.2 Chap.3)	08 Hours	L1, L2, L3
Module -4		
Inner Product Spaces: Inner products; inner product spaces; orthogonal sets and projections; Gram-Schmidt process; QR-factorization. (Ref.1 Chap. 8)	08 Hours	L2, L3, L4
Module -5		
Symmetric Matrices and Quadratic Forms: Diagonalization; quadratic forms; constrained optimization; Singular value decomposition. (Text.2 Chap.7)	08 Hours	L1,L2, L3, L4
Revised Bloom's Taxonomy Levels (RBT Levels):- L1 = Remembering , L2 = Understanding, L3 = Applying, L4 = Analyze		

Course Outcomes:

At the end of the course, student will be able to:

CO-1 : Analyze whether a system is consistent or inconsistent and its solution is unique or infinite.

CO-2 : Perform row operations on matrices and find bases and dimension of vector spaces.

CO-3 : Linearly transform the system from one dimension to another and represent the pertinent linear transformation in matrix form.

CO-4 : Compute orthogonal and orthonormal vectors required to analyze image and signal processing problems.

CO-5 : Apply techniques of constrained optimization and singular value decomposition for problems arising in power/control system analysis, signals and systems.

Question paper pattern:

Note:- The SEE question paper will be set for 100 marks and the marks will be proportionately reduced to 60.

- The question paper will have ten questions.
- Each full Question consisting of 20 marks. There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

TEXT BOOKS:

1. David C. Lay, “Linear Algebra and its Applications,” 3rd edition, Pearson Education (Asia) Pte. Ltd,2005.
2. Kenneth Hoffman and Ray Kunze, "Linear Algebra," 2nd edition, Pearson Education (Asia) Pte. Ltd/2004.

REFERENCE BOOKS:

1. Bernard Kolman and David R. Hill, "Introductory Linear Algebra with Applications”, Pearson Education (Asia) Pte. Ltd, 7th edition, 2003.
2. Gilbert Strang, "Linear Algebra and its Applications”, 3rd edition, Thomson Learning Asia, 2003.