

B.E (OPEN TO ALL PROGRAMMES OF ENGINEERING) Choice Based Credit System (CBCS) and Outcome Based Education (OBE) SEMESTER - VI OPEN ELECTIVE-A ADVANCED LINEAR ALGEBRA				
Course Code	18MAT653	CIE Marks	40	
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	60	
Credits	3	Exam Hours	03	
Course Learning Objectives: <ul style="list-style-type: none"> To familiarize the important tools of linear algebra, that are essential in all branches of engineering. To develop the knowledge/skills of linear transformation and decomposition techniques in a comprehensive manner. 				
Module-1				
Linear Equations: Consistent and inconsistent systems and its solution sets; LU-decomposition. Vector Spaces: Vector spaces; subspaces; Linearly independent and dependent vectors; Bases and dimension; coordinate vectors; computations concerning subspaces-Illustrative examples.				
Module-2				
Linear Transformations: Linear transformations; algebra of transformations; representation of transformations by matrices; linear functional; Non singular Linear transformations; inverse of a linear transformation; Problems on Rank-Nullity theorem.				
Module-3				
Inner Product Spaces: Inner products; inner product spaces; orthogonal sets and orthogonal projections; Gram-Schmidt orthogonalization process; QR- decomposition.				
Module-4				
Introduction to Spectral Theory: Eigen values and eigenvectors; Diagonalization; quadratic Forms, constrained optimization; Singular value decomposition.				
Module-5				
Engineering Applications: i) Graphs and Networks (Article No:10.1, P.No:452-461, Text No. 2). ii) Matrices in Engineering (Article No:10.2, P.No:462-473, Text No. 2). iii) Computer Graphics.(Article No:10.9, P.No:596-602, Ref No. 3).				
Course outcomes: At the end of the course the student will be able to: CO1: Analyze whether a system is consistent or inconsistent, its solution is unique or infinite and find bases and dimension of vector spaces required in network analysis. CO2: Linearly transform the system from one dimension to another in matrix form ,required to analyze image processing problems. CO3: Compute orthogonal and orthonormal basis vectors required to analyze image and signal processing problems. CO4: Apply techniques of constrained optimization and singular value decomposition for problems arising in control system analysis, signals and systems. CO5: Apply linear algebraic tools to analyze problems in graphs and networks problems, computer graphics.				
Question paper pattern: <ul style="list-style-type: none"> The question paper will have ten full questions carrying equal marks. Each full question will be for 20 marks. There will be two full questions (with a maximum of four sub- questions) from each module. Each full question will have sub- question covering all the topics under a module. The students will have to answer five full questions, selecting one full question from each module. 				
Sl No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbook/s				

1	Linear Algebra and its Applications	David C. Lay	Cambridge University Press	3 rd Edition, 2017.
2	Introduction to Linear Algebra	Gilbert Strang	Wellesley-Cambridge Press	5 th Edition, 2016.
Reference Books				
3	Introductory Linear Algebra with Applications	Bernard Kolman and David R. Hill	Pearson Education (Asia) Pvt. Ltd	7 th Edition, 2003
4	Linear Algebra	Kenneth Hoffman and Ray Kunze	Pearson Education (Asia) Pte. Ltd, 2004.	2 nd Edition, 2004
5	Elementary Linear Algebra - Applications Version	Howard Anton and Chris Rorres	Wiley, 2014	11 th Edition, 2014