

- Frame a policy
- Predict business opportunity
- Design the prototype
- Gain knowledge on system implications.

MA6201	LINEAR ALGEBRA				L	T	P	EL	TOTAL	CREDITS
					3	1	0	3		5
OBJECTIVES: <ul style="list-style-type: none">To learn to analyze a linear system of equationsTo study the properties of a linear transformationTo understand the process of orthogonalizationTo learn to solve linear equations using different methodsTo understand the applications of linear algebra in engineering										
MODULE I						L	T	P	EL	
						5	1	-	3	
Vector spaces – Subspaces – Linear combinations and linear system of equations										
SUGGESTED ACTIVITIES : <ul style="list-style-type: none">Problem solving sessions										
SUGGESTED EVALUATION METHODS: <ul style="list-style-type: none">Tutorial problemsAssignment problemsQuizzes										
MODULE II						L	T	P	EL	
						5	1	-	3	
Linear independence and Linear dependence – Basis and Dimension										
SUGGESTED ACTIVITIES : <ul style="list-style-type: none">Problem solving sessionsApplications in real life problems										
SUGGESTED EVALUATION METHODS: <ul style="list-style-type: none">Tutorial problemsAssignment problemsQuizzes										
MODULE III						L	T	P	EL	
						5	1	-	3	
Linear Transformation – Null space, Range space - Dimension theorem - Matrix representations of Linear Transformations										
SUGGESTED ACTIVITIES : <ul style="list-style-type: none">Problem solving sessions										
SUGGESTED EVALUATION METHODS: <ul style="list-style-type: none">Tutorial problemsAssignment problemsQuizzes										
MODULE IV						L	T	P	EL	
						5	1	-	3	
Eigenvalues and Eigenvectors of a linear transformation – Diagonalization of linear transformations – Application of diagonalization in a linear system of differential equations										

SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> • Problem solving sessions • Applications in real life problems 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> • Tutorial problems • Assignment problems • Quizzes 				
MODULE V	L	T	P	EL
	6	2	-	6
Inner Product Spaces –Norms - Orthogonal vectors – Gram Schmidt orthogonalization process - Least Square Approximations				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> • Problem solving sessions 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> • Tutorial problems • Assignment problems • Quizzes 				
MODULE VI	L	T	P	EL
	3	1	-	3
Solution of linear system of equations – Direct method: Gauss elimination method – Pivoting – Gauss Jordan method -LU decomposition method – Cholesky decomposition method				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> • Problem solving sessions • Applications in real life problems 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> • Tutorial problems • Assignment problems • Quizzes 				
MODULE VII	L	T	P	EL
	3	1	-	3
Iterative methods: Gauss-Jacobi and Gauss-Seidel – SOR Method				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> • Problem solving sessions • Applications in real life problems 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> • Tutorial problems • Assignment problems • Quizzes 				
MODULE VIII	L	T	P	EL
	3	1	-	3
Eigenvalue Problems: Power method – Inverse Power method - Jacobi's rotation method				
<ul style="list-style-type: none"> • SUGGESTED ACTIVITIES : • Problem solving sessions • Applications in real life problems 				

SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> • Tutorial problems • Assignment problems • Quizzes 				
MODULE IX	GENERALISED INVERSES	L	T	P
		3	1	-
QR decomposition - Singular Value Decomposition method				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> • Problem solving sessions • Applications in real life problems 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> • Tutorial problems • Assignment problems • Quizzes 				

OUTCOMES:

Upon completion of the course, the students will be able to

- Perform linear transformations and write down the matrix representing a linear transformation
- Find the Gram-Schmidt orthogonalization of a matrix
- Determine the rank, determinant, eigenvalues and eigenvectors, diagonalization, and different factorizations of a matrix
- Solve a linear system of equations using direct and iterative methods
- Solve Eigen value problems
- Formulate linear equations for real life problems and solve them

TEXT BOOKS:

1. Stephen H. Friedberg, Insel A.J. and Spence L.E., "Linear Algebra", 4th. Edition, Prentice - Hall of India, New Delhi, 2003.
2. M.K.Jain, S.R.K.Iyengar, R.K.Jain, "Numerical Methods for Scientific and Engineering Computation", New Age International (P) Limited, New Delhi, 2003.
3. Richard Bronson, "Matrix Operations", Schaum's Outline Series, 1989.

REFERENCES:

1. Strang G., "Linear Algebra and its Applications", Thomson (Brooks/Cole), New Delhi, 2005.
2. Kumaresan. S., "Linear Algebra – A Geometric Approach", PHI, New Delhi, 2010.
3. Faires J.D. and Burden R., "Numerical Methods", Brooks/Cole (Thomson Publications), New Delhi, 2002.
4. Gerald C.F., Wheatly P.O., "Applied Numerical Analysis", Pearson Education India, New Delhi, 2002.

EVALUATION METHOD TO BE USED:			
Category of Course	Continuous Assessment	Mid – Semester Assessment	End Semester
Theory	40	20	40

CO – PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓	✓	✓								✓
CO2	✓	✓	✓	✓	✓							✓
CO3	✓	✓	✓	✓	✓							✓
CO4	✓	✓	✓	✓	✓							✓
CO5	✓	✓	✓	✓	✓							✓
CO6	✓	✓	✓	✓	✓							✓

CS6201	GRAPH THEORY		L	T	P	EL	CREDITS
			3	1	0	3	5
Prerequisites for the course: Discrete Mathematics							
OBJECTIVES: <ul style="list-style-type: none"> To understand the fundamentals of graph theory To study the proofs related to various concepts in graphs To study about the different types of graphs and their properties To learn about the distinguishing features of various graph algorithms To study the applications of graphs in solving engineering problems 							
MODULE I INTRODUCTION			L	T	P	EL	
			4	1	0	3	
Introduction - Graph Terminologies - Types of Graphs - Isomorphism - Isomorphic Graphs - Operations on graphs - Degree sequences - Euler graph - Hamiltonian Graph - Related theorems.							
SUGGESTED ACTIVITIES : <ul style="list-style-type: none"> EL: Graphs and tournaments, Graphs in real world applications 							
SUGGESTED EVALUATION METHODS: <ul style="list-style-type: none"> Assignment on graphs in real world applications 							
MODULE II EDGE GRAPH			L	T	P	EL	
			3	1	0	3	
Edge Graphs and Traversability - Eccentricity Sequences and Sets – Isometry.							
SUGGESTED ACTIVITIES : <ul style="list-style-type: none"> Graph Isometry Problems 							
SUGGESTED EVALUATION METHODS: <ul style="list-style-type: none"> Tutorial problems Quizzes 							
MODULE III TREES			L	T	P	EL	
			3	1	0	3	
Trees -Properties- Distance and Centres - Types - Rooted and Binary Tree- Tree Enumeration- Labeled Tree - Unlabeled Tree							