



Indraprastha College for Women

University of Delhi

Work Plan for ODD SEMESTER – 2025

Course Name:	B.Sc.(H) Computer Science
Paper Title:	Mathematics for Computing
Unique Paper Code:	2342011103
Semester:	I
Faculty(s):	Mr. Harendra Pratap Singh
Year:	2025-2026

Work Plan			
Unit No.	Learning Objective	Lecture No.	Topics to be Covered
I	Introduction to Matrix Algebra	1	Echelon Form of a Matrix
		2	Echelon Form of a Matrix
		3	Rank of a Matrix
		4	Determinant and Inverse of a Matrix
		5	Solution of System of Non-Homogeneous Equations: Gauss elimination
		6	Solution of System of Homogeneous Equation: Gauss Jordan Method
IV	Vector Calculus	7	Vector Algebra, Laws of Vector Algebra
		8	Dot Product, Cross Product
		9	Vector and Scalar Fields
		10	Ordinary Derivative of Vectors, Space Curves
		11	Partial Derivatives, Del Operator
		12	Gradient of a Scalar Field
		13	Directional Derivative, Gradient of Matrices
		14	Divergence of a Vector Field, Laplacian Operator
		15	Curl of a Vector Field.

II	Vector Space and Linear Transformation	16	Vector Space
		17	Vector Space
		18	Sub-spaces
		19	Linear Combinations
		20	Linear Span
		21	Convex Sets
		22	Linear Independence/Dependence
		23	Linear Independence/Dependence
		24	Basis & Dimension
		25	Basis & Dimension
		26	Basis & Dimension
		27	Linear Transformation on finite dimensional vector spaces
		28	Linear Transformation on finite dimensional vector spaces
		29	Inner Product Space
		30	Inner Product Space
		31	Schwarz Inequality
		32	Orthonormal Basis
		33	Orthonormal Basis
34	Gram-Schmidt Orthogonalization Process.		
35	Gram-Schmidt Orthogonalization Process.		
36	Gram-Schmidt Orthogonalization Process.		
III	Eigen Value and Eigen Vector	37	Characteristic Polynomial
		38	Cayley Hamilton Theorem
		39	Eigen Value of a Matrix
		40	Eigen Vector of a matrix
		41	Eigenspaces
		42	Diagonalization
		43	Positive Definite Matrices
		44	Applications to Markov Matrices
		45	Applications to Markov Matrices

Unit	Contents/Syllabus
I	Introduction to Matrix Algebra: Echelon Form of a Matrix, Rank of a Matrix, Determinant and Inverse of a Matrix, Solution of System of Homogeneous & Non-Homogeneous Equations: Gauss elimination and Solution of System of Homogeneous Equation: Gauss Jordan Method
II	Vector Space and Linear Transformation: Vector Space, Sub-spaces, Linear Combinations, Linear Span, Convex Sets, Linear Independence/Dependence, Basis & Dimension, Linear Transformation on finite dimensional vector spaces, Inner Product Space, Schwarz Inequality, Orthonormal Basis, Gram-Schmidt Orthogonalization Process.
III	Eigen Value and Eigen Vector: Characteristic Polynomial, Cayley Hamilton Theorem, Eigen Value and Eigen Vector of a matrix, Eigenspaces, Diagonalization, Positive Definite Matrices, Applications to Markov Matrices
IV	Vector Calculus: Vector Algebra, Laws of Vector Algebra, Dot Product, Cross Product, Vector and Scalar Fields, Ordinary Derivative of Vectors, Space Curves, Partial Derivatives, Del Operator, Gradient of a Scalar Field, Directional Derivative, Gradient of Matrices, Divergence of a Vector Field, Laplacian Operator, Curl of a Vector Field.
S. No.	Name of Authors/Books/Publishers
1.	Kreyszig Erwin. Advanced Engineering Mathematics , 10th Edition, Wiley
2.	David C. Lay, Steven R. Lay and Judi J. McDonald. Linear Algebra and its applications , 5 th Edition, Pearson

Paper Components			
Credits	Lecture (L)	Tutorial (T)	Practical (P)
4	3	-	1
Assessment Scheme			
S.No.	Component	Marking Scheme	Total Marks
1	Internal Assessment <ul style="list-style-type: none"> Assignment/Quiz/Project/Presentation Class Test Attendance 		30
		12	
		12	
		06	
2.	Continuous Assessment (Tutorial) <ul style="list-style-type: none"> Activity 1 		NA
		NA	
		NA	

	<ul style="list-style-type: none"> • Activity 2 • Attendance 	NA	
3.	Practical <ul style="list-style-type: none"> • Continuous Assessment • End Term Written/Practical Exam • Viva 	10	40
		20	
		10	
4.	End Semester Examination		90