



Indraprastha College for Women University of Delhi

Work Plan for ODD SEMESTER – 2026

Course Name:	B.Sc.(H) Computer Science
Paper Title:	Mathematics for Computing
Unique Paper Code:	2342011103
Semester:	I
Faculty:	Dr. Harendra Pratap Singh
Year:	2026-2027

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

II	Vector Space and Linear Transformation	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	0	1
Assessment Scheme			
S.No.	Component	Marking Scheme	Total Marks
1	Internal Assessment - Assignment - Class Test - Attendance		30
		12	
		12	
		6	
2.	Continuous Assessment (Tutorial) - Activity 1 - Activity 2		NA
		NA	
		NA	

	Attendance	NA	
3.	Practical - Continuous Assessment - End Term Written/Practical Exam - Viva	10 20 10	40
4.	End Semester Examination		90