

The Maharaja Sayajirao University of Baroda Polytechnic Higher Payment Program Diploma in Computer Engineering			ACADEMIC YEAR 2021-2022	
Year	II	NUMERICAL METHODS AND GRAPH THEORY (CSE3324)	Lecture Hrs per week	4
Semester	I		Max marks	100
Pre-Requisite: Basics Calculation, C Programming.				
CO1	Apply numerical methods such as Bisection, False Position, Newton–Raphson, and Secant techniques to obtain approximate solutions of nonlinear equations and analyze numerical errors.			
CO2	Solve systems of linear equations using Gauss Elimination, Gauss–Jordan, Jacobi, and Gauss–Seidel iterative methods.			
CO3	Perform various interpolation techniques and numerical integration methods.			
CO4	Explain the properties of graphs using graph terminology, matrix representations, connectivity concepts, and shortest path algorithms.			
CO5	Apply graph algorithms such as Dijkstra, Prim’s, Kruskal’s, matching, and covering algorithms to solve graph-theoretic problems.			
BT	1. Remember 2. Understand 3. Application 4. Analysis 5. Evaluation 6. Creation			
COURSE CONTENT/SYLLABUS				
Unit	Unit Name	Hrs	Weightage	CO
1	NUMERICAL COMPUTATION Computer Arithmetic: floating point number operations, normalization and their consequences, Floating point represent of Numbers, Sources of Errors, Non-Associativity of Arithmetic, Propagated Errors. Bisection, False position, Newton Raphson, Secant method, Convergence of solution.	10	18	CO1, CO2
2	SIMULTANEOUS LINEAR EQUATIONS Linear system, Coefficient-matrix, Augmented matrix gauss Elimination method, Gauss Jordan method, Gause- Jacobi Iteration, Gauss- seidel Iteration method.	10	20	CO2
3	NUMERICAL INTEGRATION AND INTERPOLATION Various methods of interpolation, Gaussian Integration	8	10	CO3
4	INTRODUCTION TO GRAPH: Graph Terminology, isomorphism, Konigsberg Bridges problem and its solution subgraphs, matrix representations, degree, operations on graphs, degree sequences, Walks, trails, paths, connected graphs, distance, cut-vertices, cut-edges, blocks, weighted graphs, shortest path algorithms, Bipartite graphs, line graphs, chordal graphs	8	12	CO4
5	MATRIX REPRESENTATION AND GRAPH ALGORITHMS: Connectivity Matrix representation of graphs, adjacency and incidence matrix Graph theoretical algorithms: Dijkstra, Prims and Kruskal; coverings, matchings: Basic equations, matchings in bipartite graphs, perfect matchings, greedy and approximation algorithms	10	20	CO4
6	PLANAR GRAPHS AND COLORABILITY: Plane and planar graphs, Outer planar graphs, Kuratowski's theorem, Euler’s formula, Detection of planarity and elementary reduction characterizations, The chromatic number, The 5 Color Theorem, The 4 Color Conjecture, The Heawood map-coloring theorem, Uniquely colorable graphs, Critical graphs.	10	20	CO4, CO5
		56	100	
REFERENCE BOOKS:				
1.	F. Harary, "Graph Theory", Narosa Publishing House, New Delhi – Chennai- Mumbai, 1988.			
2.	Douglas B. West, "Introduction to Graph Theory", Pearson Education, Second edition (Indian), 2002.			
3.	Narsingh Deo, "Graph Theory with Applications to Engineering and Computer Science", Prentice-Hall of India, Pvt. Ltd., New Delhi, 1987.			
4.	Numerical methods by E. Balaguruswamy , McGraw Hill Education			
5.	Numerical Methods in Engineering and Science, B.S. Grewal and J.S. Grewal, , 6th edition, Khanna Publishers			
6.	Introductory Methods of Numerical Analysis, S.S. Sastrv. 4th edition. PHI Learning Private Limited. New Delhi. 2007.			

