

ST. XAVIER'S COLLEGE [AUTONOMOUS], KOLKATA
Department of Computer Science

Paper Code: HCSCR2041T	Discrete Structures (Theory)	Marks: 100
Sl. No.	Group A	No. of Periods
1.	Counting Theory Sets - finite and Infinite sets, uncountable Infinite Sets; functions, relations, Properties of Binary Relations, Closure, Partial Ordering Relations; counting - Pigeonhole Principle, Permutation and Combination; Mathematical Induction, Principle of Inclusion and Exclusion.	13
2.	Recurrences Recurrence Relations, generating functions, Linear Recurrence Relations with constant coefficients and their solution, Substitution Method, Recurrence Trees, Master Theorem	13
	Total	26
Sl. No.	Group B	No. of Periods
3.	Propositional Logic Logical Connectives, Well-formed Formulas, Tautologies, Equivalences, Inference Theory	7
4..	Introduction to Probability Theory Introduction to discrete probability, sample space, Finite probability space, Conditional probability, Independence, Independent repeated trials, Bernoulli Trials and Binomial distribution, probability distribution of Random variable, Expectation of random variable, Variance	14
5.	Graph Theory Definition of Graph, Graph Terminology, Finite and Infinite graphs. Directed and undirected graphs, Degree, Isolated vertex, Pendant vertex. Null graphs. Walks: Paths and circuits. Connected and disconnected graphs, Euler's graphs, Hamiltonian paths and circuits. Planer Graph, Isomorphic graph, coloring graphs	9
6.	Graph Algorithms Adjacency Matrix, Floyd's shortest Path algorithm, Trees, Shortest spanning tree using Kruskal Algorithm and Prim's Algorithm, Dijkstra's Algorithm to find shortest path from a given vertex, Breadth First Search Algorithm (BFS), Depth First Search Algorithm Problems(DFS).	9
	Total	39
Recommended Books:		
1. C.L. Liu , D.P. Mahopatra, Elements of Discrete mathematics, 2nd Edition , Tata McGraw Hill, 1985 2. Kenneth Rosen, Discrete Mathematics and Its Applications, Sixth Edition ,McGraw Hill 2006 3. M. O. Albertson and J. P. Hutchinson, Discrete Mathematics with Algorithms , John wiley Publication, 1988 4. J. L. Hein, Discrete Structures, Logic, and Computability, 3rd Edition, Jones and Bartlett Publishers, 2009 5. D.J. Hunter, Essentials of Discrete Mathematics, Jones and Bartlett Publishers		