

PIT31001 DISCRETE STRUCTURES

Module-1.(15 Hours)

Sets and Propositions: Principle of Inclusion and Exclusion, Mathematical induction, Propositions, Logical Connectives, Conditionals and Biconditionals, Logical Equivalences, Predicate Calculus, Quantifiers, Theory of inference, Methods of proof. Relations and Functions: properties of binary relations, Closure of relations, Warshall's algorithm, Equivalence relations, Partial ordering relations and lattices, Chains and antichains, Functions, Composition of Functions, Invertible Functions, Recursive Functions, Pigeonhole principle.

Module-2. (5 Hours)

Numeric Functions and Generating Functions: Discrete Numeric functions, Generating Functions, Recurrence Relations and Recursive Algorithms: Recurrence relations, Linear recurrence relations with constant coefficients, Solution of recurrence relations by the method of generating functions, Divide and conquer algorithms,

Module-3.(10 Hours)

Groups and Rings: groups and subgroups, Cosets and Lagrange's theorem, Codes and Group codes, Error detection and correction using Group codes, Isomorphism, Homomorphism and normal subgroups, Rings, Integral domains and Fields, Boolean Algebras: Lattices and algebraic systems, Principle of duality, Distributive and complemented lattices, Boolean functions and Boolean expressions, Simplification of logic expressions using Karnaugh Map, Design and Implementation of Digital Networks, Switching Circuits.

Module-4.(10 Hours)

Graphs and Trees: Basic terminology, Diagraphs and relations, representation of Graphs, operations on graphs, paths and circuits, graph traversals, shortest path in weighted graphs, Eulerian paths and circuits, Hamiltonian paths and circuits, Traveling sales person's problem, Planar graphs, Graph Coloring, Trees, Rooted trees, Binary search trees, Spanning trees, Minimum spanning trees, Kruskal's Algorithm, Prim's Algorithm.

Text Book:

1. C. L. Liu, D. P. Mohapatra, Elements of Discrete Mathematics: A computer Oriented Approach, McGraw Hill Education (India) Private Limited, 4th Edition, 2013.

Reference Books:

1. R.K.Bisht, and H.S.Dhami, Discrete Mathematics, Oxford University Press, First Edition, 2015
2. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw Hill, 5thed, 2003.
3. J. P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications, to Computer Science, TataMc-Graw Hill, 2001.
4. Joe L. Mott, A. Kandel, and T. P. Baker, Discrete Mathematics for Computer Scientists & Mathematics, Prentice Hall of India, 2nd Edition, 2006.
5. N. Deo, Graph Theory with applications to Engineering & Computer Science, Prentice Hall of India, 2006.
6. S. Lipschutz, Discrete Mathematics, Tata McGraw Hill, 2005