MScIT-09 Discrete Mathematics

Unit-1 : Sets, Relation and Functions

Sets – the Empty Set, Finite and Infinite Set, Equal and Equivalent set, Subsets, Power set, Universal set, Venn Diagram, Complement of a set, set operations. **Relations:** Cartesian products, Relation - equivalence relation - partition - partial order relation; **Functions:** Definition, Inverse functions - Composition of functions - Properties of functions - Binary operation

Unit- 2 : Mathematical Logic-1

Propositions, connectives, conditionals and biconditionals, well formed formulas, tautologies, equivalence of formulas, duality law, normal forms

Unit- 3 : Mathematical Logic-2

Inference theory for propositional calculus; predicate calculus: predicates, free and bound variables, inference theory of predicate calculus

Unit- 4 : Counting Principles

The Pigeonhole principle -. counting; **Permutation and Combination:** Definition of Permutation and combination, Simple application of permutation and combination

Unit- 5 : Basic Algebraic Structure

Definition and basic properties of semi groups and groups; Subgroup and homomorphpism; lattices as partially ordered set, properties of lattice, Boolean algebra

Unit 6: Graph Theory

Basic terminologies;
Representation of graphs: Matrix representation and Adjacency list representation,
Paths and circuits : Topological sort. Minimum spanning tree- Kruskal and Prim's algorithm, Eulerian paths and circuits, Hamiltonian paths and circuits, planar graphs,
Grapg traversal Techniques=Df Traversal and BF traversal, Weighted Graphs and Bitpartite Graph.
Trees : Definition – leaf , root , branch node, internal node.

Suggested readings:

1. Elements of Discrete mathematics: C.L Lieu , Mc Graw Hill
2. Discrete Mathematical Structure with Application to Computer Science: Trembly J.P Mc Graw Hill