

B. Sc. 402

Discrete Mathematics

Unit I:

Introduction: Introduction to discrete structure & its significance for computer science, Counting, Permutation, Combination, pigeonhole, Relation- Type and compositions of relations, Pictorial representation of relations, Closures of relations, Equivalence relations, Partial ordering relation. Function- Types, Composition of function, Recursively defined function

Unit II:

Mathematical Induction: Peano's axioms, Mathematical Induction Discrete Numeric Functions and Generating functions Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients. Algebraic Structures: Properties, Semi group, Monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group.

Unit III:

Propositional Logic: Proposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram, Lattices: Introduction, Ordered set, Hasse diagram of partially ordered set

Unit-IV

Graph theory: Definition of Graph Theory, finite and infinite graphs, Incidence and degree, null graphs, subgraphs, walks, path and circuit in a graph, trees properties of trees, cut sets and cut vertices, planner graphs, incidence matrix, directed graphs, Adjacency Matrices, Traversal- Breadth First Search and Depth First Search. Minimum Cost Spanning Trees, Prim and Kruskal algorithms.

References:

1. Trembly J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw-Hill Pub. Co. Ltd,
2. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fourth Edition, Pearson Education Asia,