HCS-C103	DISCRETE MATHEMATICS	L	T	P	C
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Prerequisite: NIL

Course Objectives:

1. To introduce the concepts of mathematical logic
2. To introduce the concepts of sets, relations, and functions.
3. To perform the operations associated with sets, functions, and relations.
4. To introduce generating functions and recurrence relations.

Course Outcomes:

CO1. Ability to apply mathematical logic to solve problems

CO2. Understand sets, relations, functions and discrete

CO3. Able to use logical notations to define and reason about fundamental mathematical concepts such as sets relations and functions

CO4. Discriminate, identify and prove the properties of groups and subgroups.

CO5. Apply the concepts of generating functions to solve the recurrence relations.

CO6. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra

Sets, Relations and Functions: Definition of Sets and subsets, De Morgan's law, Cardinality, Mathematical induction; Propositions; Equivalence relations; Binary, Equivalence and partial ordering relations, chains and anti chains, Job sequencing problem, Pigeonhole principle.

Introduction to Algebra: Groups, Subgroups, Cosets, Lagrange's Theorem, Permutation Group, Isomorphism and Homomorphism, Normal Subgroups, Rings, Integral Domain, Fields.

Mathematical Logic : Notation; Connectives; Normal forms; Principal Normal Forms; Theory of Inference for Statement Calculus; Predicate calculus; Inference theory of the Predicate Calculus.

Permutation &Combinations: Introduction, Rules sum & products, Permutations, Combinations, Generation of permutation & combinations, Discrete probability, Conditional probability.

Discrete Numeric Functions and Generating Functions: Manipulation, Asymptotic behaviour; Generating Functions. Recurrence Relations.

Boolean Algebra : Lattices and Algebra Systems; Principle of Duality; Basic Properties of Algebraic System defined by Lattice; Distributive and Complemented Lattices; Boolean Lattices and Boolean Algebra; Uniqueness of Finite Boolean algebra; Boolean Functions and Boolean Expressions; Propositional Calculus

Recommended Books:

1. C. L. Liu, Elements of Discrete Mathematics, McGraw Hill
2. B. Colman and R.C. Busby, Discrete Mathematical Structure for Computer Science, PHI
3. P. Trembley and R. P. Manohar, Discrete Mathematical Structures with applications to Computer Science, McGraw Hill