# SYLLABUS

**MT(N)-220**            **Discrete Mathematics**                    **Maximum marks – 70**

**Set Theory and Logics:** Definition of Sets, Types of Sets, Relations between Sets, Venn Diagrams, Counting Principles, Cardinality, Pigeonhole Principle, Types of Relations, Definition of Function, Composition of Functions, Propositional Logic, Basic Logic, Tautologies and Contradictions, Rule of Inference, Predicate Logic, fundamental kinds of quantification, Contradiction.

**Combinatorics:** Mathematical Induction, Recursive Mathematical Definition, Recursive Mathematical Definition, Recurrence Relation, Modelling with Recurrence relation, Order and Degree of Recurrence Relations, Linear Homogenous Recurrence Relations, Generating Function, Properties of Generating Function, Solution of Linear Recurrence Relations using Generating Functions, Solution of combinatorial problem using Generating Function.

**Algebraic Structure:** Binary Composition & its properties, Definition of an algebraic structure, Semi-group, Monoid, Abelian Group, Subgroup, Lagrange's Theorem, Cyclic Group, Permutation Group, Ring, Subrings, Ring Homomorphism, Integral Domain, Field.

**Graph Theory:** Basic Terminology, Types of Graphs, Connected graphs & its components, Euler Graph, Hamiltonian path and Circuit, Graph Colouring& Chromatic number, Trees, Properties of Trees, Types of Trees (Rooted, Binary), Tree Traversing, Binary Search Tree, Basic concepts of Automation theory, Deterministic Finite State Automata, Minimization of Finite Automata, Mealy Machine.