1ˢᵗ Semester	MCA01001	Discrete Mathematics	L-T-P 3-0-0	3 CREDITS

Module-I (10 Hours)

Logic: Propositional equivalence, predicates and quantifiers, Methods of proofs, proof strategy, sequences and summation, mathematical induction, recursive definitions and structural induction, program correctness, prepositional calculus.
Counting: The basics of counting, the pigeonhole principle, permutations and combinations, recurrence relations, solving recurrence relations, generating functions, inclusion-exclusion principle, application of inclusion-exclusion.

Module-II (10 Hours)

Relations: Relations and their properties, n-array relations and their applications, representing relations, closure of relations, Warshall's algorithm, equivalence of relations, partial orderings.
Graph theory: Introduction to graphs, graph terminology, representing graphs and graph isomorphism, connectivity, Euler and Hamilton paths, planar graphs, graph coloring, introduction to trees, application of trees.

Module-III (06 Hours)

Group theory: Groups, subgroups, generators and evaluation of powers, cosets and Lagrange's theorem, permutation groups and Burnside's theorem, isomorphism, auto orphisms, homomorphism and normal subgroups, rings, integral domains and fields.

Module-IV (08 Hours)

Lattice theory: Lattices and algebras systems, principles of duality, basic properties of algebraic systems defined by lattices, distributive and complimented lattices, Boolean lattices and Boolean algebras, uniqueness of finite Boolean expressions.

Module-V (06 Hours)

Coding theory: Coding of binary information and error detection, decoding and error correction.

Books:

1. C. L. Liu, D.P. Mohapatra "Elements of Discrete Mathematics- A Computer-Oriented Approach", 4th Edition, Tata McGraw Hill, 2013.
2. K.H. Rosen, "Discrete Mathematics and its application", 5th edition, Tata McGraw Hill Publication
3. G. Shankar Rao, "Discrete Mathematical Structure", New Age Publisher
4. D. P. Acharjaya, Sreekumar "Fundamental Approach to Discrete Mathematics", New Age Publisher