MTH403:MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

Course Outcomes: Through this course students should be able to

CO1 :: visualize formal logical arguments using propositional logic.

CO2 :: discuss problem solving through the basics of combinatorics.

CO3 :: apply the concepts of trees to find the shortest path.

CO4 :: analyze basic discrete structures and algorithms.

CO5 :: discuss properties of graphs and be able to relate these to practical examples.

CO6 :: evaluate theorems about trees,connectivity, coloring and planar graphs.

Unit I

Mathematical logic : introduction, conjunction, disjunction & negation, propositions and truth table, tautologies and contradictions, equivalence of formulas, duality law, predicates, the statement function, variables and quantifiers, predicate formulas, methods of proof (inference theory)

Unit II

Ordered Sets, Lattices, Boolean algebra : partially ordered sets, external elements of POSET, HASSE diagrams of POSETS, well-ordered sets, lattices, bounded lattices, distributive lattices, introduction to boolean algebra, basic definitions, duality, basic theorems, boolean algebras as lattices

Unit III

Techniques of Counting : introduction, basic counting principles, mathematical functions, permutations, combinations, the pigeonhole principle

Unit IV

Graph theory I : terminology and special types of graphs, graph isomorphism, paths, cycles and connectivity, Euler and Hamilton path and graphs

Unit V

Graph theory II : shortest path problems, planner graphs, graph coloring, chromatic number of graphs, tree and its properties, rooted tree

Unit VI

Spanning tree and tree traversal : spanning and minimum spanning tree, binary search tree, infix, prefix, and post-fix notation, pre-order traversal, in-order traversal, and post-order traversal

Text Books:

1. DISCRETE MATHEMATICS AND ITS APPLICATIONS by KENNETH H ROSEN., M.G.Hills

References:

1. DISCRETE MATHEMATICS (SCHAUM'S OUTLINES) (SIE) by SEYMOUR LIPSCHUTZ, MARC LIPSON, VARSHA H. PATIL, MCGRAW HILL EDUCATION