

MTH403:MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

L:3 T:1 P:0 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: identify logical notations and methods to prove or disprove specific logical propositions.

CO2 :: describe lattices and its algebraic structures to form partially ordered sets.

CO3 :: obtain solutions of counting problem by using elementary counting techniques based on sum and product rules, permutations, combinations and pigeonhole principle.

CO4 :: distinguish different types of graphs digraphs and trees, and identify their main properties.

CO5 :: employ the properties of graphs to find shortest path and related practical problems.

CO6 :: compute a minimal spanning tree for a given weighted graph.

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