MTH136:DISCRETE STRUCTURES

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

Course Outcomes: Through this course students should be able to

CO1 :: understand the formal logical arguments using propositional logics.

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

CO3 :: analyze the basic discrete structures and algorithms.

CO4 :: discuss the properties of graphs and be able to relate these with practiclal examples.

CO5 :: explain a recursive solution is apprppriate for a problem.

CO6 :: study the concept of shortest path using tree.

Unit I

Set Theory,Relation and Function : sets, description of a set, types of sets, subsets, power set, Venn diagrams, operation on sets (union, intersection and difference), laws of set theory, cartesian product of sets, relations, functions, some functions and their graphs (identity, polynomial, modulus function and greatest integer function), one-one and onto functions

Unit II

Logic Calculus : introduction to logic, propositions and compound propositions, basic logical operations (conjunction, disjunction, negation), propositions and truth tables, tautologies and contradiction, logical equivalence, conditional and biconditional statements

Unit III

Logic Gates and Recurrence Relations : introduction to logic gates,combination of gates, implementation of logic gates to the switching circuits, introduction to recursion, recurrence relation, solving recurrence relation, linear homogenous recurrence relation with constant coefficient and their solution

Unit IV

Graph Theory-I : introduction and basic terminology, graphs, multigraphs, degree of a vertex, handshaking theorem, sub graphs, homeomorphic and isomorphic graphs, paths, connectivity, connected components, distance and diameter, cut points and bridges

Unit V

Graph Theory-II : Eulerian graphs,Hamiltonian graphs, Euler theorem, planar graphs, maps, regions, Euler formula, non planar graphs, Kuratowski's theorem (without proof), graph coloring, chromatic number of a graph, complete graph and its coloring, regular and bipartite graphs and their coloring

Unit VI

Shortest Paths & Trees : labelled and weighted graph, shortest path in weighted graphs, Dijkstra’s algorithm to find shortest path, introduction to tree, rooted tree, binary tree, spanning tree, minimum spanning tree, Kruskal and Prims algorithms to find minimum spanning tree

Text Books:

1. DISCRETE MATHEMATICS & ITS APPLICATIONS by KENNETH H ROSEN, MCGRAW HILL EDUCATION

References:

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

2. NCERT MATHEMATICS TEXTBOOK FOR CLASS XI by NCERT, NCERT