MTH116:MATHEMATICAL FOUNDATION-II

L:3 T:2 P:0   Credits:5

Course Outcomes: Through this course students should be able to

- identify the concept of functions and basic logical operations used in tautology, contradiction and logical equivalence.

- develop the various methods for finding solutions of linear homogeneous recurrence relations.

- define and distinguish between different types of graphs.

- construct the basic mathematical background for understanding the algorithm used in graph coloring, shortest path and minimum spanning tree.

Unit I

Functions and Logic Calculus : Types of Function, 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 II

Logic Gates and Recurrence Relations : Introduction to Logic Gates, Combinations of Gates, Implementation of Logic Expressions with Logic Gates and Switching circuits, Introduction to Recursion, Recurrence Relation, Solving Recurrence Relation, Linear Homogenous Recurrence Relation with constant coefficient and their solution.

Unit III

Graph Theory : 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 IV

Euler Graphs : Eulerian Graphs, Hamiltonian Graphs, Euler theorem, Planar Graphs, Maps, Regions, Euler Formula, Non planar graphs, Kuratowski's Theorem (without proof).

Unit V

Graph Coloring and Shortest Paths : Graph Coloring, Chromatic Number of a Graph, Labelled and Weighted Graph, Shortest Path in weighted Graphs, Dijkstra's Algorithm to find shortest path, Complete graph and its coloring, Regular and Bipartite Graphs and their coloring

Unit VI

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

References:

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