

DISCRETE MATHEMATICAL STRUCTURES (Department of I.T.)

Credits	Periods			Exam Hrs.	Sessional Marks	Exam Marks	Total Marks
	Theory	Tutorial	Lab				
3	3	1	-	3	40	60	100

Course Outcomes : At the end of the course student should be able

CO -1	To understand set theory, relations , mathematical logic , mathematical reasoning and to study about the validity of the arguments.
CO -2	Be able to apply basic counting techniques to solve combinatorial problems.
CO -3	To understand Recurrence Relation, Generating functions and solving problems involving recurrence equations.
CO -4	To familiarize the different types of binary relations and related algorithms on transitive closure.
CO -5	To familiarize with the applications of graphs , trees and algorithms on minimal spanning tress.

UNIT-I : MATHEMATICAL LOGIC (15 Periods)

Sets-Operations on sets-relations-functions-Fundamentals of Logic- Logical inferences-Methods of proof of an implication-First Order logic and Other methods Proof -Rules of inference for quantified Propositions –Mathematical Induction.

UNIT II : ELEMENTARY COMBINATORICS (08 Periods)

Basics of Counting- Combinations and Permutations-Their Enumeration with and without repetition-Binomial coefficients-Binomial and Multinomial Theorems-The Principle of Inclusion-Exclusion.

UNIT III : RECURRENCE RELATIONS (08 Periods)

Generating Functions of Sequences-Calculating their Coefficients-Recurrence relations-Solving recurrence relations-Method of characteristic Roots- Non-homogeneous Recurrence relations and their solutions.

UNIT IV : RELATIONS AND DIGRAPHS (09 Periods)

Relations and Directed Graphs - Special Properties of Binary relations- Equivalence Relations-Ordering Relations-Lattices and Enumeration- Operations on relations-Paths and Closures-Directed Graphs and Adjacency matrices .

UNIT V : GRAPHS

(20 Periods)

Introduction to Graphs – types of Graphs – Graphs basic terminology and special types of simple graphs – representation of graphs and graph isomorphism – Euler paths and circuits- Hamilton paths and circuits – Planar graphs – Euler’s formula.

Introduction to Trees and their properties – Spanning Trees – Depth First Search , Breadth First Search – Minimum Spanning Trees – Kruskal’s Algorithm and Prim’s Algorithm.

TEXT BOOK:

- 1). Joe L. Mott, Abraham Kandel & T. P. Baker, “Discrete Mathematics for computer scientists & Mathematicians” Prentice Hall of India Ltd, New Delhi.

REFERENCE BOOKS:

- 1) Keneth. H. Rosen, “Discrete mathematics and its applications”, Tata McGraw- Hill Publishing Company, New Delhi
- 2) “Discrete mathematics” by Richard Johnsonbaug, Pearson Education, New Delhi.