

DISCRETE MATHEMATICS

II Year I Semester: CSE/IT/CSIT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	Total
A5BS16	PCC	3	1	0	4	30	70	100

COURSE OBJECTIVES:

The course should enable the students to:

1. To help students understand discrete and continuous mathematical structures
2. To impart basics of relations and functions
3. To facilitate students in applying principles of Recurrence Relations to calculate generating Functions and solve the Recurrence relations
4. To acquire knowledge in graph theory

COURSE OUTCOMES:

At the end of the course, student will be able to

1. Analyze and examine the validity of argument by using propositional and predicate calculus
2. Apply basic counting techniques to solve the combinatorial problems
3. Apply sets relations and digraphs to solve applied problems
4. Solve the given recurrence relation using different methods such as substitution, Generating function and characteristics roots equation.
5. Use the basic concepts of graph theory and some related theoretical problems

UNIT-I MATHEMATICAL LOGIC

Classes: 11

Statements and notations, Connectives, Well formed formulas, Truth Tables, Tautology, Equivalence implication, Normal forms, Logical Inference, Rules of inference, Direct Method, Direct Method using CP(Conditional Proof), Consistency, Proof of contradiction, Automatic Theorem Proving.

UNIT-II RELATIONS

Classes: 16

Introduction to set theory, Relations, Properties of Binary Relations, Equivalence Relation, Transitive closure, Compatibility and Partial ordering relations, Lattices, Hasse diagram. Functions: inverse Function , Composition of functions.

UNIT-III ELEMENTARY COMBINATORICS

Classes: 12

Basis of counting, Combinations & Permutations, Enumeration of Combinations and Permutations, Enumeration of Combinations and Permutations With repetitions, Enumerating Permutations with Constrained repetitions, Binomial Coefficients, Binomial and Multinomial theorems, The principles of Inclusion – Exclusion, Pigeon- hole principles and its applications.

UNIT-IV RECURRENCE RELATION

Classes: 11

Generating Functions, Function of Sequences, Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating functions , The method of Characteristics roots, Solution of Inhomogeneous Recurrence Relation.

UNIT-V GRAPHS

Classes: 10

Basic Concepts, Isomorphism and Subgraphs, Trees and their properties, Spanning Trees- DFS,BFS, Minimal Spanning Trees- Prims, Kruskal's Algorithm, Planar Graphs, Euler's Formula, Multi graph and Euler circuits, Hamiltonian Graphs, Chromatic number.

Text Books:

1. Discrete Mathematics for computer scientists & Mathematicians, *J.L. Mott, A. Kandel, T.P. Baker* PHI
2. Discrete Mathematical Structures With Applications to Computer Science, JP Tremblay, R Manohar

Reference Books:

1. Logic and Discrete Mathematics, *Grass Man & Trembley*, Pearson Education.