DISCRETE MATHEMATICAL STRUCTURES
(Common to CSE&IT)

II B. Tech. - I Semester

Course Code: A3CS07

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COURSE OVERVIEW:
Earn the fundamental concepts in mathematics. It can be used by the students in computer science as an introduction to the underlying ideas of mathematics for computer science. It explains topics like mathematical logic, predicates, relations, functions, combinatory, and graph theory

COURSE OBJECTIVES:
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

COURSE OUTCOMES:
At the end of the course students 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. Use the basic concepts of graph theory and some related theoretical problems
5. Apply the concepts in NET, GATE, PGECET and other competitive examinations

SYLLABUS

UNIT - I
Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, Tautology, Equivalence implication, Normal forms, Quantifiers, Universal quantifiers. Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, Proof of contradiction, Automatic Theorem Proving.

UNIT - II
Relations: Properties of Binary Relations, Equivalence Relation, Transitive closure, Compatibility and Partial ordering relations, Lattices, Hasse diagram. Functions: inverse Function , Composition of functions, Recursive Functions.

UNIT - III
Elementary Combinatorics: Basis of counting, Combinations & Permutations, With repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, The principles of Inclusion – Exclusion, Pigeon- hole principles and its applications.

UNIT - IV
Recurrence Relation: Generating Functions, Function of Sequences, Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating functions , Characteristics roots solution, In homogeneous Recurrence Relation.

UNIT - V
Introduction to Trees, Spanning Trees, DFS,BFS, Minimal Spanning Trees, Prims, Kruskal's Algorithm, Representation of Graphs, Planar Graphs, Graph theory and applications. Isomorphism and sub graphs, Multi graph and Euler circuits, Hamiltonian Graphs, Chromatic number.

TEXT BOOKS:
1. T1. Discrete Mathematics for computer scientists & Mathematicians, *J.L. Mott, A. Kandel, T.P. Baker PHI*

REFERENCES:
1. R1. Logic and Discrete Mathematics, *Grass Man & Trembley*, Pearson Education.