



GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DISCRETE MATHEMATICS

Course Code: GR22A2075
II Year I Semester

L/T/P/C: 2/1/0/3

Course Outcomes:

1. Use propositional and predicate logic in knowledge representation and truth verification.
2. Demonstrate the application of discrete structures in different fields of computer science.
3. Apply basic and advanced principles of counting to the real-world problems.
4. Able to formulate the problem and solve using recurrence relations and generating functions.
5. Devise the given problem as a graph network and solve with techniques of graph theory.

UNIT I

Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms.

Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction.

UNIT II

Set Theory: Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram.

Functions: Inverse Function Composite of functions, recursive Functions, Lattice and its Properties, Pigeon hole principle and its application.

Algebraic Structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

UNIT III

Elementary Combinatorics: Basics of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion.

UNIT IV

Recurrence Relation: Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, solving recurrence relation by substitution and Generating funds, Characteristics roots, solution of Inhomogeneous Recurrence Relation.

UNIT V

Graph Theory: Representation of Graph, Depth First Search, Breadth First Search, Spanning Trees, planar Graphs, Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments



Text Books/ References:

1. Discrete and Combinational Mathematics- An Applied Introduction-5thEdition–
Ralph.P.Grimaldi.PearsonEducation
2. Discrete Mathematical Structures with applications to computer scienceTrembly J.P.
&Manohar.P,TMH
3. Mathematical Foundations for ComputerScienceEngineers,JayantGanguly,Pearson
Education
4. Discrete Mathematics and its Applications, Kenneth H. Rosen,FifthEdition.TMH.
5. Discrete Mathematics with Applications, ThomasKoshy,Elsevier
6. Discrete Mathematical Structures, BernandKolman, Roberty C. Busby, SharnCutter
Ross, Pearson