## DISCRETE MATHEMATICS

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| **Paper Code** | **CEN-303** |
| **Course Credits** | **4** |
| **Lectures / week** | **3** |
| **Tutorial / week** | **1** |
| **Course Description** | **UNIT – I**<br>Review of Relations, equivalence relations, partial orders relations, hash function, characteristics function. Algebraic structure: semi-groups, monoids, groups, permutation groups, isomorphism, rings, fields, integral domain; Lattice.<br>**UNIT- II**<br>Definition and properties of graphs, directed and undirected graphs, degree sequence, cycles, path, connectivity, adjacency matrix, incidence matrix. Complete graphs, Regular graphs, Bipartite graphs, Planar graphs. Graph Isomorphism. Euler circuit, Hamiltonian circuit. Coloring of graphs: Welch-Powell algorithm. Shortest path algorithm.<br>**UNIT- III**<br>Introduction to recurrence, common recurrence relations. Generalized linear homogenous and non-homogenous recurrence relations, Solving recurrence relations: Iteration method, characteristic equation method. Introduction to generating functions. Solving recurrences using generating functions. Solving simultaneous recurrence relations.<br>**UNIT- IV**<br>Propositional calculus, principle of inclusion and exclusion, pigeonhole principle, principle of mathematical induction, permutation and combination, recursive functions, Boolean algebra.<br>**UNIT – V**<br>Introduction to Linear programming problems, modeling linear |

programming problems. Solving linear programming problems: Graphical methods, Simplex algorithm. Dual of LPP and duality principle.

**References / Text Books:**

- K. H. Rosen, Discrete Mathematics and its Applications, Seventh Edition, McGraw Hill International Editions.
- C. L. Liu, Elements of Discrete Mathematics, McGraw Hill International Editions.
- E. G. Goodaire, Discrete Mathematics with Graph Theory, Prentice-Hall of India.
- Thomas Koshy, Discrete Mathematics with Applications, Elsevier Academic Press.
- J L Mott, A Kandel, T P Baker, Discrete Mathematics for Computer Scientists & Mathematicians, Prentice-Hall of India.
- K. D. Joshi, Foundations of Discrete Mathematics, Wiley Eastern Ltd.

**Computer Usage / Software Requires:**