



Semester – 6		
BRANCH	Subject	Subject Code
B.Sc. (Maths) –DSE2	Elements of Discrete Mathematics	MADSE2-161

Course Learning Outcomes (CLO):- The course will enable the students:

1. Apply the Boolean algebra, switching circuits and their applications.
2. Minimize the Boolean Function using Karnaugh Map.
3. Understand the lattices and their types.
4. Graphs, their types and its applications in study of shortest path algorithms.
5. Test whether two given graphs are isomorphic.
6. Understand the Eulerian and Hamiltonian graphs.
7. Represent graphs using adjacency and incidence matrices.

Unit - I

1.1 Indian logic

Origins, The schools Vaisheshika, Catuskoti, Nyaya, Jain logic, Buddhist logic, Navya-Nyaya, Influence of Indian logic on modern logic, Boolean Logic and Indian Thoughts

1.2 Relations

Binary, Inverse, Composite and Equivalence relation, Equivalence classes and its properties, Partition of a set, Partial order relation, Partially ordered and Totally ordered sets, Hasse diagram

1.3 Lattices

Definition and examples, Dual, bounded, distributive and complemented lattices

Unit – II

2.1 Boolean Algebra

Definition and properties, Switching circuits and its applications, Logic gates and circuits

2.2 Boolean functions

Disjunctive and conjunctive normal forms, Bool's expansion theorem

2.3 Minimize the Boolean function using Karnaugh Map

Unit – III

Graphs:

Definition and types of graphs, Subgraphs, Walk, path and circuit, Connected and disconnected graphs, Euler graph, Hamiltonian path and circuit, Dijkstra's Algorithm for shortest paths in weighted graph

Unit – IV

Tree:

Trees and its properties, Rooted, Binary and Spanning tree, Rank and nullity of a graph, Kruskal's and Prim's Algorithm, Cut-set and its properties, Fundamental Circuit and Cut-Set, Planar graphs, Kuratowski's two graphs, Matrix representation of graphs, Incidence, Adjacency, Circuit, Cut-Set, Path.