**BCA1C02 – Discrete Mathematics**

**Course Number: 6 Contact Hours per Week: 4 Number of Credits: 3 Number of Contact Hours: 64 Hrs. Course Evaluation: Internal – 15 Marks + External – 60 Marks**

**Objectives**

• To learn mathematical logic and Boolean algebra. Prerequisites

• Basic mathematical knowledge

**Course Outline**

**UNIT I (12T)** Mathematical Logic: Propositions and logical operators, Truth tables, equivalence and implementation, Laws of logic, Quantifiers. Set theory: Introduction, concept of set of theory relation, types of relation, equivalence relation.

**UNIT II (12T)** Boolean Algebra and its properties, Algebra of propositions & examples, De-Morgan‟s Laws, Partial order relations, greatest lower bound , least upper bound, Algebra of electric circuits & its applications. Design of simple automatic control system

**UNIT III (14T)** Graph: Simple and multigraph, Incidence and degree, Isomorphism, Sub graphs and Union of graphs, connectedness, Walks, Paths and Circuits, Euler‟s Formula, Eulerian graph, Hamiltonian graph, Chromatic Graphs, Planer Graphs, Travelling salesman problem, Complete, Regular and Bipartite graphs, Directed Graphs

**UNIT IV (14T**) Trees: Properties of trees, pendant vertices. Centre of a tree, rooted and binary trees, spanning trees, spanning tree algorithms, fundamental. circuits; spanning trees of a weighted graph: cutsets and cut-vertices; fundamental cutsets; connectivity and separativity; network. flows; max-flow min-cut theorem.

**UNIT V (12T)** Plan on graphs, dual graphs, Kuratowski's two graph, matrix representation of graphs, incidence matrix, directed graphs, digraphs, directed paths and connectedness. Eular digraphs

**Textbooks**

1. Discrete Mathematical Structures with applications to Computer Science, J.K. Tremblay and R.Manohar, McGraw Hill

**References:**

1. Elements of Discrete Mathematics, C. L. Liu, TMH Edition
2. Discrete mathematical Structures, Kolman, Busby, Ross, Pearson
3. Graph theory, Harry, F., Addison Wesley
4. Finite Mathematics