CSE208C DISCRETE MATHEMATICS

B. Tech. Semester – IV(Computer Science and Engg.)

w.e.f. 2019-2020

L	T	P	Credits			
3	0	0	3	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To Use set notation, terms related to sets, relations and functions and to construct induction proofs.
2. To understand the concept of logical equivalence, truthtables, rules of inference and predicate logic.
3. To classify the algebraic structures and evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
4. To develop a given problem as graph networks and solve with techniques of graph theory and tree concepts.

UNIT-I

Sets, Relation and Function: Operations and Laws of Sets, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets Cartesian Products, Disjunctive and Conjunctive Normal Form Binary Relation : representation of relations, Partial Ordering Relation, Equivalence Relation, Image of a Set, Function: Sum and Product of Functions, Bijective functions, Inverse and Composite

Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

UNIT-II

Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination. Introduction to recurrence relations and generating functions.

Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof, Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

UNIT-III

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function,

UNIT-IV

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.