10. **Details of the Course:**

Sl. No.	Contents	Contact Hours
1	**Unit 1:** **Set Theory:** Introduction ,Elements of a Set, Standard Sets and Symbols ,Roster Method, Set Builder Method, Cardinal Number (Dimension or Order) of a Set, Types of Sets, Venn-Euler Diagrams, Union of Sets, Intersection of Sets, Disjoint Sets, Difference of Two Sets, Complement of a Set, Distributive Laws, Symmetric Difference of Sets, Fundamental Products , Index and Indexed Sets , Partitions of Sets , Minsets, Countable and Uncountable Sets , Algebra of Sets and Duality , Computer Representation of Sets , The Inclusion and Exclusion Principle	9
2	**Unit 2:** **Relations and Functions:** The Cartesian Product of Sets, Important Results on Cartesian Product, Binary Relation Defined in a Set, Domain and Range of a Relation, Set Operations on Relations, Properties of Relations, Partial Order Relations, Equivalence Relation, Definition and Notation of a Function: Range and Domain of a Function, Function as Sets of Ordered Pairs, Difference between Relation and Function, Difference between a Function and its Value Types of Functions, Invertible Functions Composition of Functions: Important Results on Composition of Functions, Identity Function Functions for Computer Science : Floor and Ceiling Functions , Fibonacci Sequence , Ackermann's Function , Characteristic Function, Mod Functions , Time-complexity Function.	9
3	**Unit 3:** **Prepositional Logic:** Preposition, Basic logical operations, Tautologies, Contradictions, contingency, conjunction (AND), disjunction (OR), and negation (NOT). Algebra of Proposition, Logical implication, Logical equivalence, Truth table, Normal forms, conjunctive normal form, Disjunctive normal form Inference Theory, Predicates and quantifiers.	9
4	**Unit 4:** **Mathematical Induction and Probability theory:** Recursion and Fundamentals of Probability Theory Introduction, Principle of Mathematical Induction, Recursive Definitions and Structural Induction, Recursive Algorithms, Introduction to Probability Theory , Concepts of Probability: Random Experiment , Sample Space , Types of Events	9
5	**Unit 5:** **Determinants and Matrices:** Introduction to Determinant, Minor, Cofactor, Rules of Sarrus , Properties of Determinants , Introduction to Matrices , Types of matrices , Addition of Matrices , Properties of Matrix Addition , Subtraction of Matrices , Scalar Multiple of a Matrix, Matrix Multiplication , Properties of Matrix Multiplication, inverse of a matrix. Solution of simultaneous non-homogenous linear equation (Upto 3 variables) using inverse of the matrix.	9
	Total	45