FACULTY OF COMPUTER SCIENCE
Master of Computer Application (Sem-I)
In Effect from Academic Year 2016-17

Subject Code : 1CS2010103	Subject Title: DISCRETE MATHEMATICS FOR COMPUTER SCIENCE
Pre-requisite :	-

Course Objective:

The objectives of the course are to:

- Apply the basic methods of discrete (noncontiguous) mathematics in Computer Science.
- Use these methods in subsequent courses in the design and analysis of algorithms, computability theory, software engineering, and computer systems.
- Understand basic data types and structures (such as numbers, sets, graphs, and trees) used in computer algorithms and systems, distinguish rigorous definitions and conclusions.
- Analyze and model computational processes using analytic methods.
- Calculate Lattices, Boolean algebra and its Application.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory		Practical		
Lecture	Tutorial	Practical	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total
3	1	-	4	60	40	-	-	100

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	**Mathematical Logic:** Introduction, Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference for Propositional logic, Mathematical Induction.	12	25
2	**Basic Structures: Sets, Relations, and Functions:** Introduction, Sets, Representation of a sets, Cartesian product of sets, Union of sets, Intersections of set, Complements, Symmetric difference, Fuzzy set, Operations on fuzzy set, Binary relation, Reflexive relation, Symmetric relation, Antisymmetric relation, Transitive relation, Equivalence relation, Associative relation, Partial ordering relation, Addition and Multiplication of functions, Types of functions.	12	25
3	**Algebraic Structure:** Binary Operation, Semi Groups, Monoids, Group, Abelian Group, Cyclic Group, Sub Group, Cosets, Normal Subgroup, Homomorphism, Isomorphism, Auto morphism.	12	25
4	**Lattices, Boolean Algebra and its Application:** Partially Ordered set (POSET), Linearly Ordered Set, Some Special Elements of Lattice, Lattices, Lattice by Hasse Diagram, Sub Lattices, Bounded Lattices, Join-irreducible element, meet irreducible element, Atom, Anti atom Complemented Lattices, Complete Lattice, Lattice Homomorphism, Lattice Isomorphism, Direct Product of two Lattices. Boolean Algebra, Sub-Boolean Algebra, Homomorphic Boolean Algebras, Isomorphic Boolean Algebras, Boolean Function, Boolean Expression, Equivalent Boolean Expression, Sum of Product(SOP) Form of Boolean Algebra, Applications of Boolean Algebra.	12	25

Course Outcome:

At the end of the course, students will be able to:

- Use logical notation to define and reason about fundamental mathematical concepts such as sets, relations and functions.
- Prove elementary properties of modular arithmetic and explain their applications in Computer Science, for example, in cryptography and hashing algorithms.
- Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.
- Calculate numbers of possible outcomes of Mathematical Logics, Sets, Relations, Functions, Algebraic Structure, Lattices and Boolean Algebra.

List of References:

1. Discrete Mathematical Structures with Applications to Computer Science J.P.Tremblay and R. Manohar; Tata McGraw-Hill
2. Discrete Mathematical & it's Applications with Combinatory and Graph Theory Kenneth H Rosen; Tata McGraw-Hill
3. Foundations of Discrete Mathematics, Joshi K. D., New Age International Ltd.
4. Discrete Mathematics and its applications, Rosen, Kenneth L, McGraw Hill.
5. Elements of Discrete Mathematics, C L Liu, D P Mohapatra, Tata McGraw-Hill