

<b>CLASS: B. Sc (Information technology)</b>		<b>Semester – III</b>	
<b>COURSE: Logic and Discrete Mathematics</b>			
<b>Periods per week</b>  <b>1 Period is 50 minutes</b>	<b>Lecture</b>	<b>5</b>	
	<b>TW/Tutorial/Practical</b>	<b>3</b>	
		<b>Hours</b>	<b>Marks</b>
<b>Evaluation System</b>	<b>Theory Examination</b>	<b>3</b>	<b>100</b>
	<b>TW/Tutorial/Practical</b>	<b>--</b>	<b>50</b>

Unit-I	<p><b>Set Theory:</b> Fundamentals - Sets and subsets, Venn Diagrams, Operations on sets, Laws of Set Theory, Power Sets and Products, Partition of sets, The principle of Inclusion-Exclusion.</p> <p><b>Logic:</b> Propositions and Logical operations, Truth tables, Equivalence, Implications, Laws of Logic, Normal forms, Predicates and quantifiers, Mathematical Induction</p>
Unit-II	<p><b>Relations, digraphs and lattices:</b> – Product sets and partitions, relations and digraphs, paths in relations and digraphs, properties of relations, equivalence and partially ordered relations, computer representation of relations and digraphs, manipulation of relations, Transitive closure and Warshall's algorithm, Posets and Hasse Diagrams, Lattice.</p>
Unit-III	<p><b>Functions and Pigeon Hole Principle:</b> Definitions and types of functions: injective, surjective and bijective, Composition, identity and inverse, Pigeon hole principle.</p>
Unit-IV	<p><b>Graphs and Trees:</b> Graphs, Euler paths and circuits, Hamiltonian paths and circuits, Planer graphs, coloring graphs, Isomorphism of Graphs.</p> <p><b>Trees:</b> Trees, rooted trees and path length in rooted trees, Spanning tree and Minimal Spanning tree, Isomorphism of trees, Weighted trees and Prefix Codes.</p>

Unit-V	<b>Algebraic Structures:</b> Algebraic structures with one binary operation – semi groups, monoids and groups, Product and quotient of algebraic structures, Isomorphism, homomorphism, automorphism, Cyclic groups, Normal sub group, codes and group codes, Algebraic structures with two binary operations – rings, integral domains and fields. Ring homomorphism and Isomorphism.
Unit-VI	<b>Generating Functions and Recurrence relations:</b> Series and Sequences, Generating Functions, Recurrence relations, Applications, Solving difference equations, Fibonacci.

**Books:**

*Discrete mathematical structures* by B Kolman RC Busby, S Ross PHI Pvt. Ltd.

*Discrete mathematical structures* by RM Somasundaram (PHI) EEE edition

**References:**

*Discrete structures* by Liu, Tata McGraw-Hill

*Digital Logic* John M Yarbrough Brooks/cole, Thompson Learning

*Discrete Mathematics and its Applications*, Kenneth H. Rosen, Tata McGraw-Hill

*Discrete Mathematics for computer scientists and Mathematicians*, Joe L.Mott, Abraham Kandel Theodore P. Baker, Prentice-Hall of India Pvt. Ltd.

*Discrete Mathematics With Applications*, Susanna S. Epp, Books/Cole Publishing Company

*Discrete Mathematilcs*, Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson, Tata McGraw-Hill

*Term Work:*

*Assignment: Should **contain at least 6 assignments (one per unit) covering the***

***Syllabus.***

**Tutorial:** At least three tutorials based on above syllabus must be conducted.