Course Code	UMS20G01T	Course Name	*DISCRETE MATHEMATICAL STRUCTURES*	Course Category	*G*	Generic Elective Course	L	T	P	C
							3	1	0	4

Pre-requisite Courses	*Nil*	Co-requisite Courses	*Nil*	Progressive Courses	*Nil*
Course Offering Department	*Mathematics and Statistics*	Data Book / Codes/Standards	*Nil*		

Course Learning Rationale (CLR):	*The purpose of learning this course is to:*	Learning	Program Learning Outcomes (PLO)

		1	2	3
CLR-1 :	To provide a strong foundations in discrete mathematics			
CLR-2 :	To apply mathematical techniques for solving real life problems			
CLR-3 :	Apply Boolean algebra, truth table, logic gates, in computer science and communication.			
CLR-4 :	To enable the use of logical, graphical and algebraic techniques wherever relevant.			
CLR-5 :	Understanding of computer science through the applications of Discrete Mathematics			
CLR-6 :	To provide a strong foundations in discrete mathematics			

Course Learning Outcomes (CLO):	*At the end of this course, learners will be able to:*	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	1 Fundamental Knowledge	2 Application of Concepts	3 Link with Related Disciplines	4 Procedural Knowledge	5 Skills in Specialization	6 Ability to Utilize Knowledge	7 Skills in Modeling	8 Analyze, Interpret Data	9 Investigative Skills	10 Problem Solving Skills	11 Communication Skills	12 Analytical Skills	13 ICT Skills	14 Professional Behavior	15 Life Long Learning
CLO-1 :	Problem solving in sets and relations. Gaining knowledge, solving the simple problems using elementary concepts.	*3*	*85*	*80*	*M*	*M*	*L*	*M*	*L*	-	-	-	*L*	*M*	*H*	*M*	-	-	-
CLO-2 :	*Understand the concepts of* Graphs terminology Sub graphs, Acyclic, Euler path, Hamiltonian Path	*3*	*80*	*75*	*M*	*M*	*M*	*M*	*M*	-	-	-	*M*	*M*	*H*	*M*	-	-	-
CLO-3 :	Logical knowledge through the Statements, connectives, arguments, validity of arguments and Normal forms using truth tables	*3*	*85*	*80*	*H*	*H*	*M*	*H*	*M*	-	-	-	*M*	*M*	*H*	*H*	-	-	-
CLO-4 :	Gain the knowledge about Trees , Labeled Trees, Binary trees ,Rooted Trees , Spanning Trees Minimal Spanning Trees	*3*	*85*	*80*	*M*	*H*	*M*	*H*	*M*	-	-	-	*M*	*M*	*H*	*H*	-	-	-
CLO-5 :	Apply the concepts of Boolean Algebra in real world problems related to Computer Science	*3*	*85*	*80*	*M*	*M*	*M*	*M*	*M*	-	-	-	*M*	*M*	*H*	*M*	-	-	-
CLO-6 :	Gaining knowledge in Boolean arithmetic to solve problems using logic gates	*3*	*75*	*80*	*M*	*M*	*M*	*M*	*M*	-	-	-	*M*	*M*	*H*	*M*	-	-	-

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to Sets – simple examples.	Logic	Graphs and Their Representation-	Trees	Sets concepts
	SLO-2	Properties of sets Types of sets	Basic explanation	Basic Graph terminology	Basic Definitions	Partition of a set
S-2	SLO-1	Venn diagram.	Statements- simple compound	Simple Problems	Basic properties of Trees	Relation concepts
	SLO-2	Problems using Venn diagrams	Symbolic representation	Drawings of Graphs	properties of Trees	matrix representation of relation
S-3	SLO-1	Relation definitions	Connectives explanation .	Special Families of Graphs	Labeled Trees	Simple problems
	SLO-2	Problems on Relations	conjunction, disjunction, negation	Simple Problems	Labeled Trees	Hasse diagrams for partial
S 4	SLO-1	Types of relation	Simple problems	Incidence graphs	Problems based on the concepts	More problems using Hasse diagrams
	SLO-2	Problems on relations	Problems using Truth Tables	Simple Problems	Undirected Trees	Lattices as posets

S-5	SLO-1	Equivalence relation-basic explanation	Tautology, contradiction	Adjacency Matrices	Simple Problems	Lattices as posets
	SLO-2	Simple problems	Problems using Truth tables	Problems using Adjacency Matrices	Binary trees	Definition of Lattices-
S 6	SLO-1	Reflexive basic explanation	logical equivalence,	vertex Degrees matrices	Rooted Trees and Branches	Properties of Lattices
	SLO-2	Simple problems	Simple truth table problems	Isomorphism of Graphs	Rooted Trees and Branches	Introduction to Boolean Algebra-basic definitions.
S-7	SLO-1	Symmetric, Transitive basic explanation	Tautological implications	Simple Problems	Spanning Trees	Axiomatic definition of boolean Algebra, logic gates.
	SLO-2	Simple problems	Simple problems	Sub graphs	Simple problems	Postulates of Boolean algebra.
S -8	SLO-1	Function	Arguments- validity of arguments	Acyclic Graphs	Spanning Trees	Postulates of Boolean algebra.
	SLO-2	Comparison of Relation and functions	Simple problems	Simple Problems	Simple problems	Problems using the postulates of Boolean Algebra
S -9	SLO-1	Types of functions	Normal forms	Digraphs	Minimal Spanning Trees	Problems using the basic concepts
	SLO-2	Simple problems	Minterms and maxterms	Problems using Digraphs	Simple Problems	Properties of Boolean algebra
S-10	SLO-1	One- one, injective, surjective, one to many, many to one functions with example	Maxterms with examples	Euler path and circuits	Problems based on Minimal Spanning Trees	Simple Boolean algebra problems
	SLO-2	Simple problems	Problems using Truth tables	Eulerian cycles	Kruskal's Algorithm	Expression of a Boolean function By Truth table method.
S-11	SLO-1	composite of two functions	Principal disjunctive normal form	Euler path and Circuits	Rooted Tree	Boolean function in canonical form by Truth table method.
	SLO-2	Simple problems	Problems using Truth tables	Hamiltonian Path and Circuits.	binary Tree and Simple Problems	DNF by Truth table method
S-12	SLO-1	composite of three functions	Principal conjunctive normal form	Problems using Hamiltonian Path	Expression of Trees	CNF by Truth table method
	SLO-2	Simple problems	Problems using Truth tables	Simple Problems	Simple Problems	Simple problems

Learning Resources	*Theory:* *1. Discrete Mathematics with Graph Theory and Combinatorics by T.Veerajan, McGraw Hill Education(India) Pvt Limited, 2007* *2. Dr. A. Singaravelu, Allied Mathematics, 7th edition, A. R. Publications, 2015.*

Learning Assessment

Level	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%) #			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	30%	-	30%	-	30%	-	30%	-	30%	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	
Experts from Academic	**Internal Experts**
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