Faculty of Computer Science & Applications
Master of Computer Application
(W. E. F.: 2023-24)

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Name of Faculty	:	**Faculty of Computer Science & Applications**
Name of Program	:	Master of Computer Application (MCA)
Course Code	:	1MDM01
Course Title	:	Discrete Mathematics
Type of Course	:	Basic Science
Year of Introduction	:	2023-24

Prerequisite	:	School level Mathematics, Binary number system
Course Objective	:	This Course will enhance the students ability to think logically and mathematically
Course Outcomes	:	At the end of this course, students will be able to:
	CO 1	Students will be able to understand and apply the concepts of sets
	CO 2	They also apply the cross product of sets and relation
	CO 3	Students will be able to understand and apply basic algorithms related with binary tree and graph

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
3	0	0	3	70	30	-	-	100

Legends: ***L****-Lecture;* ***T****–Tutorial/Teacher Guided Theory Practice;* ***P****–Practical,* ***C*** *– Credit,* ***SEE*** *– Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.))*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	**Set Theory:** Basic Concept of Set Theory Equality of Sets, Cartesian product, The power set, Some operation on sets, Venn Diagrams. **Matrices:** Types of Matrices, Equality of matrices, sum and difference of two matrices, Multiplication of two matrices, Transpose of matrices, Symmetric Matrices, Boolean Matrix Operation	8	25%	CO 1
2	**Relations:** Definition, Binary Relation, Representation, Domain, Range, Universal Relation, Union, Intersection, and Complement operations on Relation, Binary Relation in a set: reflexive, symmetric, transitive, Anti-symmetric relation, relation	10	20%	CO 1

	matrix and graph of relation, Equivalence Relation.			
3	**Functions:** Introduction and Definition of Function, co-domain, rang, image, Types of Function, composition of function, inverse function	6	15%	CO 1
4	**Mathematical Logic:** Propositions and Logical Operations, Truth Tables, De Morgan's' Laws, Conditional statement, Method of proof, Mathematical Induction, Mathematical Statements	6	15%	CO 2
5	**Graphs and Trees:** Introduction to Graphs, Directed Graphs or Digraphs, Complete Graph, Directed complete Graph, Regular graph, Bipartite Graph, Null Graph, Sub graph, isomorphism, path of a given graph, length of path, simple path, elementary path, Cycle, Elementary cycle **Trees:** Definition, branch nodes, leaf nodes ,root, different representation of trees, forests, Sub Trees; M- ary tree, full or complete M-ary tree, Binary Tree, full binary tree, conversation of M-ary tree to binary tree..	12	25%	CO 3

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**25%**	**35%**	**20%**	**10%**	**5%**	**5%**

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment	Teaching Hours
1	Complement of asset; Union, Intersection.	4
2	Test whether two given sets are equal or not.	4
3	Difference and Symmetric Difference of two sets	6
4	Find Transpose of matrix A and of matrix B. Find $(A^T+B^T)$and (A^T-B^T). Check whether $(A^T+B^T)=(A+B)^T$ and $(A^T-B^T)= (A-B)^T$	6
5	Add matrix A and null matrix. Subtract null matrix from matrix A.	6

Suggested Learning Websites

Sr. No.	Name of Website
1	https://archive.mu.ac.in/myweb_test/
2	https://www.tutorialsduniya.com/notes/discrete-mathematics-notes/

Reference Books

Sr. No.	Name of Reference Books
1	"Discrete Mathematical Structures" : Tremblay and Manohar, Tata McGraw Hill
2	"Discrete Mathematics" : 1st edition by Maggard, Thomson
3	"Discrete Mathematics" :Dr.Purnima P. Patwardhan, Technical Publications
4	"Discrete Mathematics" Dr.SwapankumarSarkar, S.Chand