Branch Name:	IMCA
Program Code:	CS301
Course Name:	Basic Mathematics
Course Code:	1CS3010104T
Pre-requisite Course:	Basic knowledge of Mathematics

Course Objective:

1. To understand the basics of Mathematics.
2. To present the foundations of many basic mathematical topics used in Computer Science including RDBMS, Data Structures, Analysis of Algorithms, Theory of Computation, Cryptography, Artificial Intelligence, Statistics and others.
3. To enhance the student's ability to think logically and mathematically.
4. To improve students' ability in calculation.
5. To enable students to obtain an intuitive and working understanding of Mathematics for the basic problems and gain experience in the solving of problems.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				**Evaluation Scheme (Marks)**				
				Theory		**Practical**		
Lecture	**Tutorial**	**Practical**	**Credit**	**University Assessment**	**Continuous Assessment**	**University Assessment**	**Continuous Assessment**	**Total**
4	1	-	5	60	40	-	-	100

Course Contents:

Unit No	**Topics**	**Total Hours**	**Weightage (%)**
1	**Mathematical Logic** Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers.	9	20
2	**Set Theory** Introduction, Definition, Basic Concepts and Notations, Ordered Pairs and Cartesian Product, Set Operations, Representation of Sets, Finite Sets, Infinite Sets (Definition) Set Operations : Union, Intersection, Addition theorem, difference, Symmetric difference, D' Morgons Law, Subsets, Power Sets, Partitions Sets.	9	20
3	**Functions** Definition of function, Types of function: One to One, onto functions, Invertible Functions, Composite function and Inverse function, Floor and ceiling functions, Integer and Absolute value functions	8	20

4	**Relation** Definition, Domain and Range of Relation, Kinds of Relation, Types of Relation, Composition of Relations, Partial Ordering and Equivalent Relation	10	20
5	**Graphs** Introduction, Definition; Initial & Terminal Nodes, Adjacent Nodes; Directed Edge, Undirected Edge, Directed Graph (Digraph), Undirected Graph, Mixed Graph; Loop (Sling); Distinct Edges, Parallel Edges; Multi-graph, Simple Graph; Weighted Graph; Isolated Nodes, Null Graph; Isomorphic Graphs; In-degree, Out-degree, Total-degree; Subgraphs; Reflexive, Symmetric, Transitive Digraphs; Paths, Length of Path of a Graph; Simple Path (Edge Simple), Elementary Path (Node Simple), Cycle (Circuit), Simple Cycle, Elementary Cycle; Path of Minimum Length (Geodesic), Distance between Two Nodes.	10	20

Text Books:

1. Bernard Kolmann & others, "Discrete Mathematical Structure", Pearson Education, Sixth Edition
2. J. P. Tremblay and R.Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw-Hill (2010) – only for Unit-5 (Graphs & Trees).

References Books:

1. K. H. Rosen, "Discrete Mathematics and its applications", Tata McGraw-Hill, 6th
2. D. S. Malik & M. K. Sen, "Discrete Mathematics", Cengage Learning (2004)
3. J. P. Tremblay and W. K. Grassman. "Logic and Discrete Mathematics", Pearson Education

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To **understand** the Basic Concepts and fundamentals of Mathematics.	2 Understanding
CLO2	To **study** the Mathematical Logic, Relations, Set Theory.	1 Remembering 2 Understanding 3 Applying
CLO3	To **apply** theory of Computation on Cryptography, Artificial Intelligence	3 Applying 2 Remembering
CLO4	Interpret propositions for given truth value.	3 Applying
CLO5	Compare usage of relations and functions.	1 Remembering 2 Understanding
CLO6	**Solve** relevant given problems using counting techniques.	3 Applying

Mapping of CLOs with Pos & PSOs

Course Learning Outcomes	Program Out comes(POs)												Program Specific Outcomes(PSOs)	
	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PS O2
CLO1		M	L	M			H	L	M		M		H	
CLO2	M	L			H	L		L		M	L	L	M	M
CLO3		L	M			M		L	M	M		L		L
CLO4	L		L	L	M		L		L		L		M	M
CLO5	M	L		M	L			M		L		L		L
CLO6		M	L		L	M	L			M			L	

H:High, M:Medium, L:Low