Course Code	**040110105**			
Category	**Interdisciplinary**			
Course Title	**Basic Mathematics**			
Scheme and Credits	**Theory**	**Tutorial**	**Lab**	**Credits**
	3	**0**	**0**	**3**
Pre-requisites (if any)	**Basic knowledge of mathematical concepts**			

1. Course Objective:

1	To understand 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.
2	To understand the concepts of sets, logic, cross product of sets and Matrix Algebra.

2. Course contents :

Module	Content	Weightage
Unit I	**Number System** Introduction, Basic Properties of Integers: Closure, Commutative Laws, Associative Laws, Identity Elements, Additive Inverse, Distributive Laws, Cancellation Laws; Well-ordering Principle; Division Algorithm: Quotient, Remainder, ***div*** and ***mod*** operators, Divisibility; Greatest Common Divisor (GCD); Euclidean Algorithm for Finding the GCD; Relative Prime; Least Common Multiples (LCM); Representation of Integers in Computer; Decimal, Binary, Octal, and Hexadecimal Representation.	**30%**
Unit II	**Set Theory** Set Theory: Basic Concepts of Set Theory: Definition, Two Methods to Describe (Represent) Sets; Examples, (Im)proper Subsets, Superset, Equality of Sets; Empty (Null) Set, Universal Set, Finite and Infinite Sets, Power Set; Operations on Sets: Union, Intersection, Complement, Venn Diagrams; Disjoint Sets, Various Laws: Identity, Idempotent, Commutative, Associative, Distributive, Absorption, DeMorgan; Difference (Relative Complement), Symmetric Difference of Two Sets; Cartesian Product; PowerSet of a Set.	**30%**
Unit III	**Matrix Algebra** Introduction; Representation of a Matrix; Equality of Matrices; Special Matrices: Rectangular / Square Matrices, Null (Zero) Matrix, Unit Matrix, Diagonal Matrices, Triangular Matrices;	**15%**

	Sum and Difference of 2 Matrices; Multiplication of 2 matrices; Transpose of a Matrix, Symmetric Matrices; Boolean (Zero-One) Matrices, Boolean Join, Boolean Meet; Theorems and Exercises (without Proof), Sparse Matrix, Magic Matrix.	
Unit IV	**Propositional Logic** Definition, Statement (Proposition) & Notation, Truth Values, Connectives: Negation, Conjunction, Disjunction, Implication(condition), Bi-implication (Bi-conditional), Truth Tables for all Connectives, Statement Formulas (Well-formed Formulas), Truth Tables, Tautologies, Contradiction, Logical Equivalence: Commutative Laws, Associative Laws, Distributive Laws, Absroption Laws, Idempotent Laws, Double Negation Law, DeMorgan's laws, Examples; Validity of Arguments, Some Valid Argument Forms: Modus Ponens, Modus Tollens, Disjunctive Syllogism, Dilemma, Equivalence of Formulas:Conjunctive Simplification, Disjunctive Addition, Conjunctive Addition, Theorems (without Proof).	**25%**

Note: *Proofs of Theorems not required*

3. Text Books:

1. Swapan Kumar Chakraborty, Bikash Kanti Sarkar "Discrete Mathematics "(Oxford Higher Education) (2011)
2. J.P.TremblayandR.Manohar,"DiscreteMathematicalStructureswithApplicationstoComputerScience",TataMcGraw-Hill(2010)
3. Bernard Kolmann & others,"DiscreteMathematicalStructure",PearsonEducation,Sixth Edition
4. D.S.Malik&M.K.Sen,"DiscreteMathematics",Cengage Learning(2004)

4. Accomplishment of the student after completing the course:

This course will enhance the student's ability to think logically and mathematically.