Branch: BCA	Semester-II
Subject Code: 2104	Lecture: 04 Credit: 04
Course Opted	Core Course -6
Subject Title	MATHEMATICS I

Course objectives:

- To understand the concepts of discrete structures viz. sets, relations and functions etc. and graph theory.
- To understand, apply and solve problems using given method.

Course Outcomes:

- Have a better understanding of sets, relations and functions
- Be able to understand Permutation and Combinations, Mathematical induction, Binomial Theorem and Graph Theory.
- Apply logic and construct simple mathematical proofs and solve problems.
- Demonstrate different traversal methods for graph

Module	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage
UNIT- I	1.	**Set Theory**: Definition of Sets, Subsets, Cardinality of Sets, types of sets: Equal Sets, Universal Sets, Finite and Infinite Sets, proper set, power sets, Operations on Sets: Union, Intersection, Complement of Sets, set difference, Cartesian Product, Venn Diagrams, and Algebra of sets	6	12
	2.	**Properties of integers:** Definition of GCD, LCM, Theorems Euclidean algorithm and problems	6	12
UNIT- II	3.	**Relations:** Definitions of Relation, Reflexive Relation, Symmetric Relation, Transitive relation, Equivalence Relation Recurrence relation: Definitions and problems	6	12
	4.	**Functions** : Define Function ,Injective functions ,Surjective functions, Bijective functions, Composite function, Inverse of a function, Domain and Range	6	12
UNIT - III	5.	**Permutations and Combinations** : Definitions: Permutation, Combination and problems	6	12
	6.	**Binomial theorem and Mathematics Induction:** Binomial Theorem : Statement and problems, Mathematical Induction: principles and problems	6	12
UNIT- IV	7.	**Matrices and Determinants** Definition of a matrix; Operations on matrices; Square Matrix and its inverse; determinants; properties of determinants; the inverse of a matrix; solution of equations	8	16

		using matrices and determinants; solving equations using determinants.		
	8.	**Graph theory:** Graphs, types of graphs, Handshaking Lemma, Isomorphism of graphs, Subgraphs, Complement of graph.	6	12
		TOTAL	**50**	**100**

Text Book:

1. Kolman, Busby and Ross, “Discrete mathematical Structures and graph theory”

Reference Books:

1. Alan Doerr, K. Levasseur, “Applied discrete structure for computer science”, Galgotia publications, 1988
2. Trembley&Manohar, “Discrete mathematical Structures with application to computer science”, McGraw Hill, 1987.
3. Swapan Kumar Chakraborty, BikashKantiSarkar, Discrete Mathematics, Oxford Higher Education, 2011
4. 5.C. L. Liu, D. P. Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, Tata Mcgraw-Hill, 3 rd Edition, 2008.S.