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| Subject Code : 1CS1010304 | Subject Title: MATHEMATICS |
| Pre-requisite : | -NONE- |

Course Objective:

In order to be able to formulate what a computer system is supposed to do, or to prove that it does meet its specification, or to reason about its efficiency, one needs the precision of mathematical notation and techniques. For instance, to specify computational problems precisely one needs to abstract the detail and then use mathematical objects such as sets, functions, relations, orders, and sequences. To prove that a proposed solution does work as specified, one needs to apply the principles of mathematical logic, and to use proof techniques such as induction. And to reason about the efficiency of an algorithm, one often needs to count the size of complex mathematical objects. The Mathematics course aims to provide this mathematical background.

| Teaching Scheme (Hours per week) | | | | Evaluation Scheme (Marks) | | | | |
|----------------------------------|----------|-----------|--------|---------------------------|-----------------------|-----------------------|-----------------------|-------|
| Lecture | Tutorial | Practical | Credit | Theory | | Practical | | Total |
| | | | | University Assessment | Continuous Assessment | University Assessment | Continuous Assessment | |
| 3 | 1 | - | 4 | 70 | 30 | - | - | 100 |

| Subject Contents | | | |
|------------------|---|-------------|------------|
| Sr. No | Topics | Total Hours | Weight (%) |
| 1 | Set Theory: Introduction, Definition and Concepts, 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 |
| 2 | Functions: Introduction: Definitions and Concepts, One to One, onto functions, Invertible Functions. Mathematical Functions (Definition and Examples) : Floor and ceiling functions, Integer and Absolute value functions, Remainder functions, Exponential functions, logarithmic functions, Recursive functions | 9 | 20 |
| 3 | Boolean Algebra Introduction, Basic Definitions, Duality, Basic Theorems, Boolean Algebras as lattices, Kinds of Lattices, Representation Theorem, and Sum of product form for sets, Sum of products form for Boolean Algebras. | 10 | 20 |
| 4 | Determinants and Matrices: Determinants, Basic theorems of determinants, Metrics -Definition and Concept, square Matrix, unit Matrix, null Matrix, Matrix Addition, Multiplication, Scalar multiplication, Transpose of a Matrix, Invertible Matrices, and Inverse of a Matrix. | 10 | 20 |
| 5 | Sequences and Series: Sequences: Introduction, Types of sequence, Arithmetic progression (A.P), Geometric Progression (G.P). Series : Introduction, Types of series, Arithmetic series (A.P) Permutation, Combinations | 10 | 20 |

Course Outcomes:

At the end of this course, the students would be able to:

- Understand fundamental mathematical concepts and terminology;
- Use and analyze recursive definitions;
- Develop Techniques for constructing mathematical proofs, illustrated by mathematics examples.

List of References:

1. Discrete Mathematics (Second Edition) S.LIPSCHUTZ, M. LIPSON (TMH)
2. Elements of Discrete Mathematics C.L. LIU (TMH)
3. Discrete Mathematics J K SHARMA (Macmillan Publishers)
4. Advance Mathematics, Ravi Gor, Nirav Prakashan