

Course Name: Bachelor of Computer Applications

Subject Name: Mathematical Foundation of Computer Science

Subject Code: TBC-103

1 Contact Hours: 42

L 3 T 0 P 0

2 Examination Duration(Hrs): Theory 0 3 Practical 0 0

3 Relative Weightage: CWE: 25 MTE: 25 ETE: 50

4 Credits: 0 3

5 Semester: ☒ Autumn ☐ Spring ☐ Both

6 Pre-Requisite: Basic knowledge of mathematics

7 Subject Area: Mathematics and Computer Science

8 Objective: To familiarize students with the logics used in the field of computer science along with the relations and functions.

9 Course Outcome: A student who successfully fulfills the course requirements will be able to-

- a. Understand the concept of relations, Posets and Hasse Diagram.
- b. Understand the concept of Functions and their types.
- c. Understand the concept of mathematical induction and generating functions.
- d. Understand the concept of linear recurrence relation with coefficients.
- e. Understand the concept of algebraic structure.
- f. Understand the basics of propositional logic.

10 Details of the Course:

Unit No.	CONTENT	CONTACT HOURS
1	Relation: Type and compositions of relations, Pictorial representation of relations, Equivalence relations, Partial ordering relation, Posets, Hasse Diagram.	8
2	Function: Types, Composition of functions, Recursively defined functions.	8
3	Mathematical Induction: Mathematical Induction, Discrete Numeric Functions, Asymptotic Behavior of functions and Generating functions, Linear recurrence relation with constant coefficients (homogeneous and non-homogeneous forms)	9
4	Algebraic Structures: Semi group, monoid, Group, Abelian group, properties of group, subgroup and their properties, Cyclic group, Cosets, lagrange's theorem, Permutation groups. Homomorphism, Isomorphism and Automorphism of groups (Definition and examples)	9
5	Propositional Logic: Preposition, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers.	8
TOTAL		42

11 Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1	J. K. Sharma, "Discrete Mathematics", Macmillan	2005
2	S.A.Sarkar, "Discrete Mathematics", S.Chand Publication	2003
3	Discrete Mathematical Structure with Application to Computer Science", TMH	2007
4	Kenneth H. Rosen, " Discrete Mathematics and its applications", TMH	2008
5	Doerr Alan & Levasseur Kenneth, "Applied Discrete Structures for Computer Science", Galgotia Pub. Pvt. Ltd	2009
6	Gersting, "Mathematical Structure for Computer Science", WH Freeman & Macmillan	2008
7	Kumar Rajendra, "Theory of Automata: Languages and Computation", PPM	2007
8	Hopcroft J.E, Ullman J.D., "Introduction to Automata theory, Languages and Computation", Narosa Publishing House, New Delhi	2003