



Marwadi University

Bachelor of Computer Application

Semester II (w.e.f. July, 2016)

Subject Code: 05BC0202

Subject Name: Foundation of Mathematics-II (Discrete Mathematics)

Learning Objectives:

The objective of this course is to present the foundations of many basic computer related concepts and provide a coherent development to the students for the courses like Fundamentals of Computer Organization, RDBMS, Data Structures, Analysis of Algorithms, Theory of Computation, Cryptography, Artificial Intelligence and others. This course will enhance the student's ability to think logically and mathematically.

Prerequisites:

Knowledge of basic concepts on Sets, different operations on sets, binary operations, functions.

Unit	Course Content	Hours
1	Introduction and Pre-requisite Importance & Purpose of Discrete Mathematical Structures; Applications; Set Theory, Functions, Relations, etc.	06
2	Mathematical Logic: Introduction, Connectives, statement formulas, principle of substitution, validity of arguments, Quantifiers, Proof techniques.	08
3	Lattices and Boolean Algebra: Relation and ordering, partially ordered sets, Lattices as poset, properties of lattices, Lattices as algebraic systems, sub-lattices, direct product and homomorphism, complete lattices, bounds of lattices, distributive lattice, complemented lattices. Introduction, definition and important properties of Boolean Algebra, Sub Boolean algebra, direct product and homomorphism, join-irreducible, meet-irreducible, atoms, anti atoms, Stone's representation theorem. (Without Proof) Note: No proof is required for Theorems or Results on lattices and Boolean Algebra. Theorems should be justified and explained by suitable examples.	10
4	Applications of Boolean Algebra : Boolean expressions and their equivalence, Minterms and Maxterms, Free Boolean algebra, Values of Boolean expression, canonical forms, Boolean functions, representation of Boolean function, Karnaugh maps, minimization of Boolean function, Quine-Mccluskey algorithm, Application to Relational Database.	10
5	Group Theory : Definition and examples of groups, abelian group, cyclic groups, permutation groups, subgroups & Homomorphism, Cosets and Lagrange's Theorem (without proof), Normal subgroups, Quotient Groups.	06
6	Graph Theory: Basic concepts of Graph theory, paths, reachability and connectedness, matrix representation of graph, trees.	08



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Text Book(s):
1. "Discrete Mathematical Structures with Applications to Computer Science", J. P. Tremblay and R. Manohar, Tata McGraw-Hill
2. "Discrete Mathematical Structure", D. S. Malik, M. K. Sen, Cengage Learning
Reference Book(s):
1. Discrete Mathematics and its applications, Tata McGraw-Hill, 6 th edition, K. H. Rosen.
2. Discrete Mathematical Structure, Pearson Education, Bernard Kolmann & others, Sixth Edition
3. Discrete Mathematics with Graph Theory, PHI, Edgar G. Goodaire, Michael M. Parmenter.
4. Logic and Discrete Mathematics, Pearson Education, J. P. Tremblay and W. K. Grassman.
Chapter wise coverage from the Text Books:
1. From Book # 1 Chapter – 2, article 2-3 (2-3.1 to 2-3.9) Chapter-3, article 3-5 (3-5.1 to 3-5.4) up to Theorem 3-5.8 Chapter – 4, articles 4-1 to 4-4 Chapter – 5, article 5-1 (5-1.1 to 5-1.4)
2. From Book # 2 Chapter – 1, articles 1.2 to 1.5 Chapter-3 article 3.3
Accomplishment of the student after completing the course :
The student will be able to apply concepts to RDBMS, perform minimization of Boolean functions, shall learn the fundamentals representations methods of graphs and trees. They shall be able to use different logical reasoning to prove theorems.