



C.U.SHAH UNIVERSITY – WADHWANCITY

FACULTY OF TECHNOLOGY AND ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

B. TECH. SEMESTER: - IV

SUBJECT NAME: - Discrete Mathematics(DSM) SUBJECT CODE: - 4TE04DSM1

Teaching and Evaluation Scheme:-

| Subject Code | Subject Name | Teaching Scheme | | | | Credits | Evaluation Scheme | | | | | | | |
|--------------|----------------------|-----------------|----|----|-------|---------|-------------------|-----|-----------------|-----|-----------|----|------------|-------|
| | | Th | Tu | Pr | Total | | Theory | | | | Practical | | | Total |
| | | | | | | | Sessional Exam | | University Exam | | Internal | | University | |
| | | | | | | | Marks | Hrs | Marks | Hrs | Pr/Viva | TW | Pr | |
| 4TE04DSM1 | Discrete Mathematics | 4 | 0 | 0 | 4 | 4 | 30 | 1.5 | 70 | 3.0 | - | - | - | 100 |

Objectives:-

After the successful completion of the course, students will be able to

- Analyze Fuzzy set Theory, Predicate Calculus.
- Solve Graph Theory and Lattices Problem
- Create a modeling of engineering problems.
- Solve Boolean Algebra and Combinatory

The course is designed in such a way that it can be covered comprehensively in period of semester.

Prerequisite:-

Students should have the basic knowledge of set theory, Algebra, Graph etc.

Course Outline:-

| Sr. No. | Course Content | Total Hours |
|---------|---|-------------|
| 1 | Predicate Calculus: Introduction, Objectives, Predicates, Statement Functions, Variable and quantifiers, Free and bound variables, special valid formulas involving quantifies, Theory of interface for the predicate calculus. | 08 |
| 2 | Fuzzy Sets: Some useful definitions, basic operations on fuzzy sets, Image and inverse images, I-V fuzzy sets, fuzzy relations. | 06 |
| 3 | Group Theory: Definitions and examples of semi groups, Monoids and groups, Abelian group, Cyclic group, Sub group, permutation group, Set Decomposition of group, Normal Subgroups, Lagrange's theorem. | 08 |

| | | |
|---|---|----|
| 4 | Lattices: Poset, Lattice as a poset, properties of lattices as algebraic systems, sub lattices, Direct product and Homomorphism, Complete Lattices, Bounds of Lattices, Distributive Lattices, Complemented Lattice. | 08 |
| 5 | Boolean Algebra: Introduction, Definition and properties, Sub-Boolean algebra direct product and homomorphism, Atoms Stone's representation theorem. Boolean expressions and their equivalences. Minterm and maxterms, Boolean algebra, Values of Boolean expressions, Canonical forms, Boolean functions, Symmetric Boolean functions. | 12 |
| 6 | Graph Theory: Basic concept of graph theory basic definitions, Path Reachability and connectedness, Matrix representation of graphs, Trees. | 06 |
| 7 | Combinatorics: Counting techniques – pigeon-hole principle, Infinite sets, Mathematical induction, Permutations. Generating functions, Recurrence relation. | 06 |

Learning Outcomes:

After the successful completion of the course, students will be able to

- Able to analyze Fuzzy set Theory, Predicate Calculus.
- Solve Graph Theory and Lattices Problem
- Create a modeling of engineering problems.
- Solve Boolean Algebra and Combinatorics

Teaching & Learning Methodology:

Assignments will be given to students for active learning

Student friendly environment i.e. more interaction between student and faculty (Drilling method)

Books Recommended:

1. Discrete Mathematical structures with application to computer science by **Jean-Paul Tremblay, R. Manohar**, McGraw-Hill, 1987
2. Discrete Mathematics and its applications by **Rosen, Kenneth L.**, Tata McGraw Hill, 7th Edition, 2007.
3. Applied discrete structures for computer science by Alan **Doerr, Kenneth Levasseur**, Macmillan, 1989
4. Discrete Mathematical structures for computer science by **Bernard Kolman, Robert C. Busby, Sharon Cutler Ross**, Pearson/Prentice-Hall, 2004
5. Fuzzy sets and fuzzy logic theory & applications by **George J. Klir, Bo Yuan**, Prentice Hall PTR, 1995.
6. Introduction to combinatorial Mathematics by **Liu, C.L.**, McGraw-Hill, 1968.