PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Applied Science & Humanities

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Discrete Mathematics (203191202)

Type of Course: BTech

Prerequisite: Basic Concepts of Set Theory, Function

Rationale: The course provides mathematical background related to Computer engineering

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/		T	P	T	CE	P	
3	2	0	5	60	-	20	20	-	100

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**UNIT-1-Sets, Relation and Function**: Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem	11%	5
2	**UNIT-2- Principles of Mathematical Induction**: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic. Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination	9%	4
3	**UNIT-3-Propositional Logic**: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency	18%	8
4	**UNIT-4-Algebraic Structures and Morphism**: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form	40%	18

5	**UNIT-5-Graphs and Trees**: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.	22%	10

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Discrete Mathematical & it's Applications with Combinatorics and Graph Theory Kenneth H Rosen; Tata McGraw-Hill
2. Discrete Mathematical Structure and It's Application to Computer Science J.P. Tremblay and R. Manohar; TataMcgraw-Hill; TMG
3. Discrete Mathematics with Applications Susanna S. Epp; Wadsworth Publishing Co. Inc.; 4
4. Elements of Discrete Mathematics A Computer Oriented Approach C. L. Liu and D P Mohapatra; Tata McGraw – Hill; 3

Course Outcome:

After Learning the course the students shall be able to:

After learning the course the students can be able to:
1. Express logical sentences in terms of predicates, quantifiers, and logical connectives.
2. Derive the solution of a given problem using deductive logic and prove the solution based on logical inference.
3. Classify an algebraic structure of any mathematical problem.
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
5. Develop the given problem as graph networks and solve with techniques of graph theory