Lecture Plan

Lecture	Section	Content
L1	1.1	Logic, Prepositions & connectives, Inverse, Converse, Contrapositive of implication.
L2	1.1	Truth tables, Tautology & Contradiction using truth tables
L3	1.2	Logical Equivalences, Laws of logic
L4	1.2	Translating English sentences – Propositional Equivalence
L5	1.3	Introduction to Quantifiers and use of Quantifiers.
L6	1.3	Problems involving Quantifiers.
L7	1.5	Rules of inference.
L8	1.5	Rules of inference for Quantified Statements-Problems.
L9	1.6	Introduction to proofs: Concept of Direct & Indirect proofs
L10	1.6	Proofs by contradiction and proofs of equivalence
L11		Tutorial
L12	2.3	Injective, Surjective and Bijective functions with examples
L13	2.3	Inverse and composition functions
L14	4.1	Mathematical Induction
L15	4.2	Strong Induction : Examples 1-4 & Exercises1-8.
L16	4.3	Recursive Definition–Recursively defined functions(Example 1-5) and Exercise 1-25.
L17	4.4	Recursive Algorithms for $n!$, a^n , $b^n \pmod m$, $\gcd(a,b)$
L18	5.1	Basics of Counting- Product Rule and Sum Rule.
L19	5.2	Pigeon hole principle – problems.
L20	5.3	Permutation, Combination and problems.
L21		Tutorial
L22	6.1	Recurrence relation: Definitions and modeling. Rabbits of Fibonacci numbers, Tower of Hanoi and codeword enumeration.
L23	6.1	Solving Linear homogeneous recurrence relations with constant coefficients.
L24	6.2	Non-homogeneous recurrence relations with constant coefficients
L25	6.2	Problems.
L26	6.4	Method of generating functions for solving homogeneous recurrence relations.
L27	6.4	Problems.
L28	6.3	Divide and Conquer Algorithms, Problems
L29	6.5	Inclusion and Exclusion Principle, problems.
L30		Tutorial
L31	7.1	Definition- Cartesian Product, Relation, Relation on a set.
L32	7.1	Properties of relations, Combining relations.
L33	7.3	Representing relations using matrices and digraphs, matrices for union, intersection.
L34	7.3	Composition, transposition, inversion and complementation.
L35	7.4	Three types of closures , Theorems (Only Statement)
L36	7.4	Warshall's Algorithm
L37	7.5	Equivalence Relations, equivalence classes.
L38	7.5	Partitions and theorems 1 and 2 (with proof).
L39	7.6	Definitions1,2,3,4 & Examples, Lexicographic ordering, Hasse Diagram
L40	7.6	Maximal and Minimal elements
L41	7.6	GLB, LUB and Lattices
L42		Tutorial
L43	8.1, 8.2	Introduction to Graphs, Definitions 1 – 7 and Examples.
L44	8.2	Theorem 1, 2, 3 (with proof)- Examples 3-7
L45	8.2	Bipartite Graphs, theorem 4 and Operations on Graphs
L46	8.3	Adjacency and Incidence matrices and Isomorphism of graphs
L47	8.4	Definition 1 - 5, Theorem 1 (with proof) and Theorem 2(without proof)
L48	8.4	Counting Paths between vertices
L49	8.5	Euler circuit and path: Definition, Theorem-1 (with proof), and Algorithm for constructing Euler Circuits.
L50	8.5	Hamilton path and circuits, Theorem 3,4 (without proof) and Gray Codes
L51	8.6	Dijkstra's Algorithm and Floyd's Algorithm and problems.
L52	8.7	Planar Graphs, Theorem 1, Corollary 1 and 2 (with proof) , Kurtowski's theorem (without proof)
L53	8.7, 8.8	Kurtowski's theorem (Only Statement), Graph Coloring: Definition and Examples
L54	8.8	Applications of Graph coloring and problems
L55		Tutorial