

101009/MA100 A DISCRETE MATHEMATICS

Course Contents and Lecture Schedule

No	Topic	No. of Lectures
1	Boolean algebra:	
1.1	Introduction of Boolean algebra	1
1.2	Truth table	2
1.3	Basic logic gate	1
1.4	Basic postulates of Boolean algebra	1
1.5	Principle of duality.	1
1.6	Canonical form, Karnaugh map	3
2	Abstract algebra	
2.1	Sets and Properties	2
2.2	Relation – Equivalence relation, Matrix of relation	3
2.3	Group – definition , Properties	1
2.4	Subgroup	1
2.5	Ring – definition, Properties	2
3	Combinatorics	
3.1	Basic counting, balls and bins problems	2
3.2	generating functions.	1

3.3	recurrence relations	2
3.4	Proof techniques,	1
3.5	principle of mathematical induction	1
3.6	Pigeonhole principle	2
4	Graph Theory	
4.1	Graphs and digraphs.	1
4.2	Complement, isomorphism, connectedness and reachability	2
4.3	Adjacency matrix, Eulerian paths and circuits in graphs and digraphs	2
4.4	Hamiltonian paths and circuits in graphs and tournaments	1
4.5	Trees; Planar graphs, Euler's formula, dual of a planer graph,	1
4.6	Independence number and clique number	1
4.7	Chromatic number, statement of Four-color theorem	1
5	Logic	
5.1	Propositional calculus - propositions and connectives, syntax; Semantics - truth assignments and truth tables	3
5.2	Validity and satisfiability, tautology	1
5.3	Adequate set of connectives; Equivalence and normal forms;	2
5.4	Compactness and resolution; Formal reducibility - natural deduction system and axiom system; Soundness and completeness	3