DEPARTMENT OF MATHEMATICS
FACULTY OF ENGINERING AND TECHNOLOGY
SRM UNIVERSITY

SEMESTER: V MA1015- DISCRETE MATHEMATICS ACADEMIC YEAR: 2015-2016

LECTURE SCHEME / PLAN

The objective is to equip the students of Engineering and Technology with the knowledge of Mathematics and its applications so as to enable them to apply them for solving real world problems.

The list of instructions (provided below) may be followed by a faculty relating to his/her own schedule includes warm-up period, controlled/free practice, and the respective feedback of the classes who handle. The lesson plan has been formulated based on high quality learning outcomes and the expected outcomes are as follows

Each subject must have a minimum of 56 hours, which in turn, 45 hours for lecture and rest of the hours for tutorials. The faculty has to pay more attention in insisting the students to have : 95 % class attendance.

UNIT I: MATHEMATICAL LOGIC			
Lect. No	**Lesson schedule**	**Learning outcomes**	**Cumulative hours**
L 1.1	Proposition and logical connectives, conditional and bi-conditional and statements	➢ Students will be able to understand Logic and mathematical reasoning and to count /enumerate objects in a systematic way. ➢ Students will be able to solve problems on Mathematical induction .	1
L1.2	Equivalence of formulas		2
L.1.3	Tautological implications		3
L.1.4	Theory of inference for statement calculus		4
L.1.5	Theory of inference : Problems solving		5
L.1.6	Indirect Method		6
L.1.7	Consistency		7
L.1.8	Predicate calculus - quantifiers		8
L.1.9	Tautological implications Theory of inference for predicate calculus		9
L.1.10	Valid formulas in predicate calculus, theory of inference in predicate calculus		10
L.1.11	Predicate calculus : Problems solving		11
L.1.12	Mathematical induction		12
L.1.13	Practice Problems		13
CYCLE TEST – I :			**DATE: 05.08.2015**

UNIT II: SET THEORY			
L.2.1	Laws of set theory	Students will be able to understand concepts of Set theory, relations, functions and to construct mathematical arguments.	14
L.2.2	Cartesian product of sets, partition of a set, minsets, Duality principle		15
L.2.3	Relation, properties of a relation.		16
L.2.4	Matrices and graph of a relation		17
L.2.5	Partial order relation, Hasse diagram		18
L.2.6	Closure properties on relations		19
L2.7	Warshall's algorithm		20
L.2.8	Function: Injective, Surjective, Bijective functions		21
L.2.9	Composition of functions, inverse functions		22
L.2.10	Combinatorics		23
L.2.11	Practice Problems		24
CYCLE TEST – II :			**DATE: 02.09.2015**
UNIT III: RECURRENCE RELATION & ALGEBRAIC SYSTEMS			
L.3.1	Formation and solving recurrence relations	Students become familiar with techniques of Recurrence Relation, Generating functions and Algebraic Systems and their applications in coding theory - Group codes.	25
L.3.2	Recurrence relations obtained from solutions		26
L.3.3	Solution of homogenous finite order relations		27
L.3.4	Solution of Non-homogeneous finite order relations		28
L.3.5	Generating functions – Solution of a recurrence relation using generating functions		29
L.3.6	Problems		30
L.3.7	Closed form expressions for generating functions		31
L.3.8	Groups		32
L.3.9	Subgroups		33
L.3.10	cyclic groups		34
L.3.11	Normal subgroups		35
L.3.12	Properties and problems		36
L.3.13	Coding theory – Group codes		37
L.3.14	Practice Problems		38
SURPRISE TEST			
UNIT IV: GRAPH THEORY			
L.4.1	Basic concepts, types of graphs		39
L.4.2	Examples		40
L.4.3	Connectivity		41

L.4.4	Graph optimization Traveling salesman problem	Students will be able to understand to apply graph theory to solve real-world problems like traveling salesman problem and networks and the maximum flow problem	42
L.4.5	Networks and the maximum flow problem		43
L.4.6	Trees – Properties of trees		44
L.4.7	Rooted trees		45
L.4.8	Spanning trees		46
L.4.9	Kruskal's algorithm problems solving		47
L.4.10	Binary trees		48
L.4.11	Tree traversals		49
L.4.12	Practice Problems		50
UNIT V: BOOLEAN ALGEBRA & FORMAL LANGUAGES			
L.5.1	Boolean algebra	Students will be able to understand Boolean algebra and its application to switching theory. To understand grammars, finite state machines and Turing Machines	51
L.5.2	Posets, Lattices		52
L.5.3	properties		53
L.5.4	Application of Boolean algebra to switching theory		54
L.5.5	switching theory problems solving		55
L.5.6	Languages recognition and generation		56
L.5.7	Phrase structure grammars and languages		57
L.5.8	Construct grammars and languages problems solving		58
L.5.9	Finite state machine recognition in regular languages		59
L.5.10	Practice Problems		60
MODEL EXAM		**12.10.2015**	**(Duration: 3 Hours)**
LAST WORKING DAY : 06.11.2015			

REFERENCES

- Tremblay J.P. and Manohar R., "Discrete Mathematical Structures with applications to Computer Science", Tata Mc Graw Hill Publishing Co., 2000
- V. Sundaresan, K. Ganesan and Ganapathy Subramanian, "Discrete Mathematics", A.R. Publications.
- T. Veerarajan, "Discrete Mathematics with Graph Theory and Combinatorics", Tata McGraw Education Private Limited.
- Venkataraman M.K., etal. "Discrete Mathematics", National Publishing Co.

- Seymour Lipschutz, Marc Lars Lipson, "Discrete Mathematics", Mc Graw Hill Inc., 1992
- Kolman and Busby, "Discrete Mathematical Structures for Computer Science", 1987
- Iyengar N.Ch.S.N. etal," Discrete Mathematics", Vikas Publishing Ltd.

WEB BASED RESOURCES

http://www.the-science-lab.com/Math/

http://botw.org/top/Science/Math/

http://dir.yahoo.com/Science/Mathematics/

http://www.cms.caltech.edu/

http://www.en.wikipedia.org

Internal marks Total: 50

Internal marks split up: Cycle Test 1: 10 Marks Model Exam: 20 Marks

Cycle Test 2: 10 Marks Surprise Test: 5 marks

Attendance: 5 marks

Dr. M. Mageswari
Assistant Professor(S.G)
Course Co-ordinator
Email: manimegalai.n@ktr.srmuniv.ac.in
Tel: +91-44-27417000 Ext: 2707

Dr. K. Ganesan
Professor & Head
Department of Mathematics
Email: hod.maths@ktr.srmuniv.ac.in
Tel: +91-44-27417000 Ext: 2701