

**DEPARTMENT OF MATHEMATICS
FACULTY OF ENGINEERING AND TECHNOLOGY
SRM UNIVERSITY**

SEMESTER: V MA1045- DISCRETE MATHEMATICS ACADEMIC YEAR: 2016-2017

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 , bi-conditional statements and truth tables.	<ul style="list-style-type: none"> 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	Laws of logic - 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	Inconsistency		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: 01.08.2016
UNIT II: SET THEORY			
L.2.1	Laws of set theory		14
L.2.2	Cartesian product of sets, partition of a set, minsets, Duality principle		15

L.2.3	Relation, properties of a relation.	Students will be able to understand concepts of Set theory, relations, functions and to construct mathematical arguments.	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
L.2.7	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-review of permutation and combinations, Pigeon hole principle		23
L.2.11	Generalized Pigeon hole principle-problems.		24
CYCLE TEST – II :			DATE: 01.09.2016
UNIT III: RECURRENCE RELATION & ALGEBRAIC SYSTEMS			
L.3.1	Formation of 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	Solving a recurrence relations-Homogeneous finite orderrelations.		26
L.3.3	Solution of non-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	Groups-definition and simple examples		31
L.3.8	Groups-Properties		32
L.3.9	Subgroups-examples		33
L.3.10	Group homomorphism-properties		34
L.3.11	Cosets and normal subgroups		35
L.3.12	Results related to Lagrange theorem		36
L.3.13	Lagrange theorem		37
L.3.14	Deduction from Lagrange theorem		38
SURPRISE TEST			
UNIT IV: VECTOR SPACE AND LINEAR TRANSFORMATION			
L.4.1	Vector space-Definition, examples. Simple Properties. Subspaces-Definition, examples. Theorems without proof.	<ul style="list-style-type: none"> Students will be able to understand vector spaces and will be able to relate to signal space. 	39
L.4.2	Linear combination of vectors-examples. Span of a set-Simple problems		40
L.4.3	Linear independence and dependence of vectors-		41

	problems. Basis of a vector space- examples			
L.4.4	Linear transformation-examples and properties.	<ul style="list-style-type: none"> • Students will learn how to express one vector in terms of other vectors • Students will be able to construct orthonormal basis • Students will learn about linear transformation and matrices. 	42	
L.4.5	Algebra of linear transformation-finding sum, difference and composition of linear transformation.		43	
L.4.6	Matrix representation of linear transformation-Problems. Representation for sum and composition		44	
L.4.7	Linear transformation corresponding to a matrix- problem.		45	
L.4.8	Inner product space-Definition and examples.		46	
L.4.9	Simple properties of inner product space, norm of a vector, Schwarz and triangular inequalities without proof and simple problems.		47	
L.4.10	Orthogonal vectors, orthonormal vectors and orthonormal basis - problems.		48	
L.4.11	Gram-Schmidt process for constructing orthonormal basis- problems		49	
L.4.12	Tutorial		50	
UNIT V: REGRESSION AND CORRELATION				
L.5.1	Principle of Least square- Straight line and parabola			51
L.5.2	Karl pearson's coefficient of correlation		Students learn to find the exact relationship between variables (or) one variable in terms of one or more variables	52, 53
L.5.3	Coefficient of multiple correlation and its properties	54, 55		
L.5.4	Coefficient of partial correlation	56, 57		
L.5.5	Multiple linear regression	58, 59		
L.5.6	Multiple nonlinear regression	60		
MODEL EXAM		20.10.2016	(Duration: 3 Hours)	
LAST WORKING DAY : 04.11.2016				

REFERENCES

1. Alan Doerr and Kenneth Levasseur, "Applied Discrete Structures for Computer Science", Galgotia Publications (P) Ltd, 1992.

2. Tremblay J. P. and Manohar R., Discrete Mathematical Structures with applications to Computer Science, Tata Mc Graw Hill Publishing Co., 35th edition,2008.
3. K.S.Narayanan and T.K.Manicavachagam Pillai, S.Viswanathan “Modern Algebra. Vo II” (Printers & Publisher)1983.
4. T. Veerarajan, Discrete Mathematics, Tata McGraw Hill Publishing company PVT .Ltd., New Delhi, 3rd Edition, 2008 .
5. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11th extensively revised edition, Sultan Chand & Sons, 2007.
6. Kenneth H.Rosen, Discrete Mathematics and its Application, Fifth edition, Tata McGraw-Hill Publishing company PVT .Ltd., New Delhi, 2003.

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
Cycle Test 2: 10 Marks
Attendance: 5 marks

Model Exam: 20 Marks
Surprise Test: 5 marks

Dr. K. Jeyalakshmi

Assistant Professor(Sr.G)

Course Co-ordinator

Email: jeyalakshmi.k@ktr.srmuniv.ac.in

Tel: +91-44-27417000 Ext: 2706

Dr. A. Govindarajan

Professor & Head

Department of Mathematics

Email: hod.maths@ktr.srmuniv.ac.in

Tel: +91-44-27417000 Ext: 2701