

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

MA1006 – STATISTICAL AND NUMERICAL METHODS

SEMESTER: VI

ACADEMIC YEAR: 2015-2016

LECTURE SCHEME / PLAN

The objective is to equip the students of Engineering and Technology, 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: TESTING OF HYPOTHESIS			
Lecture No	Lecture Schedule	Learning outcomes	Cumulative hours
L 1.1	Introduction	Students can apply how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests	1
L1.2	Problems in Large Sample Tests Test for single mean,		2
L.1.3	Difference between means		3, 4
L.1.4	Proportion, difference between proportion		5
L.1.5	Standard deviation		6
L.1.6	Difference between standard deviation		7
L.1.7	Chi – square tests - Goodness of fit		8
L.1.8	Problems		9,10
L.1.9	Independence of attributes Contingency table		11
L.1.10	Problems		12
SURPRISE TEST			
UNIT II - ANALYSIS OF VARIANCE			
L.2.1	Small sample tests based on t and F distribution - Test for single mean.	To test the homogeneity of various means how the analysis of variance procedure can be used.	13,14
L.2.2	Difference between means,		15
L.2.3	Paired t-test,		16,17

L.2.4	Test for equality of variances- F - test.		18
L.2.5	Analysis of Variance – One way Classification		19,20
L.2.6	Analysis of Variance – Two way Classification		21,22
L.2.4	ANOVA – Problems		23,24
UNIT III - SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS			
L.3.1	Introduction: Solving linear algebraic and transcendental equations by direct and Iterative methods.	Students will get a knowledge of solving the system of equations by one of the easiest techniques	25
L.3.2	Newton-Raphson method. Solving numerical problems		26
L.3.3	Direct method : Gauss elimination method - Problems		27,28
L.3.4	Problems based on Gauss Jordan method		29
	Finding the inverse of a given matrix by Gauss elimination method - Problems	Learner will understand the concept of finding inverse of a given matrix by another simplest way.	31,32
	Finding the inverse of a given matrix by Gauss Jordan method - Problems		33
	Iterative methods: Gauss Jacobi method. Gauss Seidel method - Problems	One applies the knowledge of solving the system of equations numerically to real world problems	34,35
L.3.5	Eigenvalues of a matrix by Power method .		36
UNIT IV - FINITE DIFFERENCES AND INTERPOLATION			
L.4.1	Introduction to First and Higher order differences. Forward and backward differences and operators	Learners will understand the basic principles of operators	37
L.4.2	Difference between the operators. Relation between the operators, Properties of operators	Knowledge in understanding the differences for future topics	38
CYCLE TEST – I :			DATE: 24.02.2016
L.4.3	Introduction to Interpolation. Newton-Gregory Forward and Backward interpolation formulae for equally spaced intervals and their applications, Numerical problems	Recognize and visualize the methods of finding intermediate values of a given function from a given set of tabular values of that function.	39,40
L.4.4	Fitting a polynomial to the given data by the above methods and hence finding an intermediate value of the given data. Numerical problems	To learn the idea of finding the actual function of the given data	41,42
L.4.5	Newton's interpolation formulae- Divided differences- Divided Difference formula for unequal intervals and its applications.	Understanding the difference between Forward and Backward differences and divided differences	43,44
L.4.6	Lagrange's Interpolation formula for unequal intervals- Problems	A knowledge of the methods of Newton and Lagrange and	45

		understands to find unknown y for a given x	
L.4.7	Finding the actual polynomial of the given numerical data by Lagrange method, Newton's divided difference method -Problems	Understands the concept more clearly and gets an idea in applying different types of methods to find an unknown intermediate value	46,47
L.4.8	Inverse Interpolation: Lagrange's inverse formula - Problems	To relate the Lagrange's and inverse Lagrange's methods and understands to find x for a given y	48
UNIT V - NUMERICAL DIFFERENTIATION AND INTEGRATION			
L.5.1	Introduction: Newton's forward and backward Differences formulae to compute first and higher order derivative - Problems.	Students get an idea of finding derivatives of a given function from a given set of tabular values at the origin, near the origin ,at the end point and near the end point	49,50,51
L.5.2	Numerical Integration-Trapezoidal rule and its applications	Learners understand the concept of numerical integration of a definite integral for a given function from a given set of tabular values.	52,53
L.5.3	Simpson's one third rule - Problems	Able to compare this rule with the previous rule and understands the advantages of Simpson's rule.	54,55
L.5.4	Problems based on Simpson's three eighth rule	Gets an idea of this rule for the kind of problems applicable	56,57
CYCLE TEST – II :		DATE: 23.03.2016	
MODEL EXAM		24.04.2016 (Duration: 3 Hours)	
LAST WORKING DAY : 12.05.2016			

TEXT BOOK:

- S.C.Gupta & V.K.Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, New Delhi, 11th edition, 2007.
- B.S.Grewal, Numerical Methods in Engineering and Science, (42th Edition), Khanna Publishers 2012.

REFERENCES

1. S. S. Sastry, Introductory methods of Numerical Analysis, Prentice Hall of India, New Delhi, 2005.
2. E. Balagurusamy, Computer oriented statistical & numerical methods-Tata McGraw Hill, New Delhi, 2000.
3. P.Kandasamy et. al., Numerical methods, S. Chand & Co., New Delhi, 2003.
4. P. Sivarama Krishna Das & C.Vijayakumari, "A text book of statistics and Numerical methods",Viji's academy, 2010.
5. Dr. M.K. Venkataraman, "Numerical Methods in Science and Engineering", National Publishing Co., 2005.

WEB BASED RESOURCES

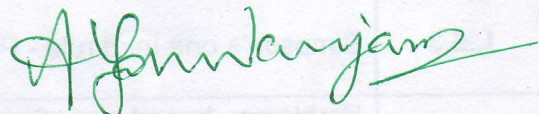
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<http://botw.org/top/Science/Math/>
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Internal Marks Total: 50

Internal Marks split up: Cycle Test : 10 Marks
Cycle Test : 10 Marks Surprise Test : 5 marks
Model Exam: 20 Marks Attendance : 5 marks


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