



DEPARTMENT OF MATHEMATICS

SEMESTER VII MA0461- PROBABILITY & STATISTICS ACADEMIC YEAR: 2014-2015
(Mechanical Civil Engineering)
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 $\geq 95\%$ class attendance.

UNIT I: PROBABILITY & RANDOM VARIABLES			
Lect. No	Lesson schedule	Learning outcomes	Cumulative hours
L 1.1	Probability – Introduction	<ul style="list-style-type: none"> ➤ Students will be able to apply the basic rules and theorems of probability theory such as Baye's Theorem, to determine probabilities. ➤ Students shall be able to solve engineering problems like the expectation and variance of a random variable from its distribution. 	1
L1.2	Probability concepts		2
L.1.3	Conditional probability		3
L.1.4	Problems in probability		4
L.1.5	Baye's theorem		5
L.1.6	Baye's theorem problems		6
L.1.7	Tutorial		7
L.1.8	One dimensional random variables		8
L.1.9	Problems in One Dimensional RV		9
L.1.10	Mean, variance and moments		10
L.1.11	Moment generating Function(MGF)		11
L.1.12	Tutorial		12
COMMENCEMENT OF CYCLE TEST – I :		DATE: 30.07.2014	
UNIT II: THEORETICAL DISTRIBUTIONS			

L.2.1	Binomial distribution – Mean & Variance	<ul style="list-style-type: none"> Students will know how to apply and choose probability distributions such as the Binomial, Poisson and Normal etc. Students can learn how to model and solve engineering problems 	13
L.2.2	Problems in Binomial		14
L.2.3	Poisson distribution – Mean & Variance		15
L.2.4	Problems in Poisson		16
L.2.5	Tutorial		17
L.2.6	Geometric distribution		18
L.2.7	Negative Binomial Distribution		19
L.2.8	Normal distribution and Properties		20
L.2.9	Problems in Normal		21
L.2.10	Exponential distribution –Mean and Variance		22
L.2.11	Memoryless Property and problems		23
L.2.12	Tutorial		24

COMMENCEMENT OF CYCLE TEST – II :

DATE: 25.08.2014

UNIT III: TESTING OF HYPOTHESIS

L.3.1	Large sample tests	<p>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</p>	25
L.3.2	Problems in Large Sample Tests		26
L.3.3	Mean, proportion		27
L.3.4	Mean, Proportion Problems		28
L.3.5	F-Test		29
L.3.6	F-Test Problems		30
L.3.7	Tutorial		31
L.3.8	Chi – square tests - Goodness of fit		32
L.3.9	Problems		33
L.3.10	Independence of attributes Contingency table		34
L.3.11	Classification of Small and Large Samples		35
L.3.12	Tutorial		36

SURPRISE TEST

UNIT IV: ANALYSIS OF VARIANCE			
L.4.1	Correlation and Properties	<ul style="list-style-type: none"> Students can able to correlate two variables X and Y and study the correlation coefficient between X and Y and also understand the Rank Correlation. Students will get an ideas how to form regression analysis can be used to develop an equation that estimates how two variables are related and to distinguish between correlation and regression. To test the homogeneity of various means how the analysis of variance procedure can be used. 	37
L.4.2	Correlation Problems		38
L.4.3	Rank Correlation and Problems		39
L.4.4	Regression and Properties		40
L.4.5	Regression Problems		41
L.4.6	Tutorial		42
L.4.7	Multiple Correlation and Problems		43
L.4.8	Multiple Regression and Problems		44
L.4.9	Analysis of Variance – One way Classification		45
L.4.10	Analysis of Variance – Two way Classification		46
L.4.11	ANOVA – Problems		47
L.4.12	Tutorial		48
UNIT V: STATISTICAL QUALITY CONTROL			
L.5.1	Introduction and Process Control	<p>Students can identify whether the production process is under the control by using control charts for variables</p> <p>Students will understand the fundamentals of quality control and the methods used to control systems and processes.</p>	49
L.5.2	Control Charts for X and R		50
L.5.3	Problems for X and R		51
L.5.4	Control Charts for X and S		52
L.5.5	Problems for X and S		53
L.5.6	Tutorial		54
L.5.7	P – Chart and Problems		55
L.5.8	NP Chart		56
L.5.9	NP Chart and Problems		57
L.5.10	C Chart		58
L.5.11	C Chart and Problems		59
L.5.12	Tutorial		60
COMMENCEMENT OF MODEL EXAM		20.10.2014	(Duration: 3 Hours)
Last working day		07-11-2014	
COMMENCEMENT OF UNIVERSITY EXAMINATION		14-11-2014	

REFERENCES:

- S. C. Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics, 9th extensively revised edition, Sultan Chand & Sons, 1999.
- Ross. S., "A first Course in Probability", Fifth Edition, Pearsons Education, Delhi 2002.
- Johnson. R. A., "Miller & Freund's Probability and Statistics for Engineers" Sixth Edition, Pearson Education, DSehi, 2000.
- Walpole, R. W., Myers, R. H. Myers R. S. L. and Ye. K, "Probability; and Statistics for Engineers and Scientists", Seventh Edition, Pearsons Education, Delhi, 2002.
- Lipschutz. S and Schiller. J, "Schaum's outlines – Introduction to Probability and Statistics", McGraw-Hill, New Delhi, 1998.
- Veerarajan T., Probability, Statistics and Random Processes, Tata McGraw Hill, 1st Reprint 2004.

WEB BASED RESOURCES

http://en.wikipedia.org/wiki/Probability_and_statistics

<http://www.math.csusb.edu/faculty/stanton/m262/>

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

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