DEPARTMENT OF MATHEMATICS
FACULTY OF ENGINERING AND TECHNOLOGY
SRM UNIVERSITY

SEMESTER IV **ACADEMIC YEAR: 2012-2013**

MA0232-PROBABILITY AND RANDOM PROCESSES
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.

Lect.No.	**Lesson schedule**	**Learning outcomes**	**Cumulative hours**
INTRODUCTION TO PROBABILITY AND RANDOM PROCESSES			
L 0.0	Warm up session - Applications of Probability and Random processes (With Real -life applications)	Student will be motivated.	1
UNIT-1 PROBABILITY AND RANDOM VARIABLES			
L 1.1	Introduction to Probability concepts.	Analyse the outcomes of random experiments and develop the concept of random variables and obtain probabilities of possible outcomes through them	2
L 1.2	Conditional probability,Independent events.		3
L 1.3	Applications of Baye's theorem.		4
L 1.4	Random variables..		5
L1.5			6
L1.6	Moments.		7
L1.7	Moment generating functions.		8
L1.8	Binomial Distribution.	To acquire knowledge to solve the special Discrete Discrete Distributions	9
L1.9	Poisson Distribution.		10
L1.10	Geometric Distribution.		11
L1.11	Exponential Distribution.	To improve the ability to understand the importance of special continuous Distributions	12
L1.12	Normal distribution.		13
L1.13	Functions of one dimensional random variable.	To grasp the knowledge while applying Chebychev`s inequality in Problems	14
L1.14	Chebyshev inequality.		15
CYCLE TEST -1 :		**DATE : 4.02.2013**	
UNIT-2 TWO DIMENSIONAL RANDOM VARIABLES.			
L 2.1	Two Dimensional Random Variables, Joint probability Mass function,joint	Explore the random experiments specified by two random variables	16

L 2.2	Probability density function, Cumulative Distribution function .	and study the Distribution of them.	17
L 2.3	Marginal probability and Conditional distributions.		18
L 2.4	Problems solving two Dimensional Discrete Random Variables.		19
L 2.5	Problems solving two Dimensional Continuous Random variables.		20
L 2.6			21
L.2.7	Transformation of two dimensional Random Variables .		22
L 2.8			23
L 2.9	Tutorial of Two dimensional Random variables		24
L 2.10			25
L 2.11	Concepts of Central Limit theorem	Acquire the knowledge the concept of convergence of random sequence and the study of random signals	26
L2.12	Application of solving central limit Theorem problems		27
L 2.13			28
L.2.14	Tutorial -Practice problems in two dimensional random variables.		29
CYCLE TEST -2 :		**DATE : 4.03.2013**	
UNIT-3 RANDOM PROCESSES			
L 3.1	Classification of Random processes.	To gain knowledge in the application of family of random variables in real life situations.	30
L 3.2	Stationarity-WSS,SSS processes.		31
L 3.3	Problems in WSS and SSS processes.		32
L 3.4	Poisson Random process,Properties.		33
L 3.6	Problems in homogeneous poisson processes.		34
L 3.7	Pure birth process.		35
L 3.8	Renewal process.		36
L 3.9	Markov chain,tpm,Transition probabilities in steady and unsteady State.		37
L3.10	Problems in homogeneous Markov chain.		38
L 3.11	Classification of states of a Markov chain.		39
L3.12	Tutorial.		40
UNIT-4 CORRELATION FUNCTIONS			
L 4.1	Autocorrelation function and its properties.	Be familiar with application of auto correlation and cross correlation functions	41
L 4.2	Problems in autocorrelation functions of WSS processes.		42
L 4.3			43
L 4.4	Crosscorrelation function and its properties.		44
L 4.5	Problems .		45
L 4.6	Linear system with random inputs.		46
L4.7			47
L 4.8	**Tutorial.**		48
UNIT-5 SPCTRAL DENSITY			

L 5.1	Basic Knowledge about Fourier Transforms and Autocorrelation functions	To familiar with various transformations	49
L 5.2	Power spectral density function	Analyze various type of functions covariance functions, autocorrelation functions , covariance functions with and without spectral properties in the frequency domain	50
L 5.3	Properties		51
L 5.4	System in the form of convolution.		52
L 5.5	Unit impulse response of the system		53
L 5.6	Einstein-Weiner-Khinchine Relationship		54
L 5.7	Cross Power Density Spectrum-properties		55
L 5.8	**Tutorial**		56
MODEL EXAMINIAION :		**DATE : 15.04.2013**	
LAST WORKING DAY : 26.04.2013			

TEXT BOOK:

T.VEERARAJAN**,**Probability,Statistics and Random Processes, Second Edition,Tata McGraw-Hill Publishing Company Limited ,New Delhi.

REFERRENCES:

- S.C.GUPTA and V.K.KAPOOR, Mathematical statistics,S.Chand&Sons,Educational publishers,New Delhi.
- TRIVEDI.K.S,Probability and Statistics with Reliability,Queueing and Computer Science Applicationc,Prentice Hall of India,New Delhi,1984'.
- A.PAPOULLIS and S.U.PILLAI,Probability Random variables and Stochastic Processes,Tata Mc-Graw Hill Publishing Company Limited.2002.

WEB BASED RESOURCES

http://www.idsc.ethz/courses/stochasticsystems
http://courses.engr.illinois.edu
http://dir.yahoo.com/Science/Mathematics
http://www.amazon.com

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

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