Department of Electronics and Communication Engineering

Bhoj Reddy Engineering College for Women: Hyderabad

Lesson Plan of faculty member for the academic year 2015 – 2016

Name of the faculty member and Department : Ms. B.Kiranmai, ECE

Subject: Probability Theory and Stochastic Processes Class: II B. Tech

Branch & Section: ECE-A Semester: I

No. of lectures per week: 4+1 (T)

Lecture Number	Date(s)	Topic to be covered
	UNIT-I: PROBABILITY AND RANDOM VARIABLE	
1.	1/7/15	Introduction
2.	3/7/15	**Probability:** Probability introduced through Sets and Relative Frequency.
3.	4/7/15	Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events.
4.	1/7/15, -, 3/7/15	Tutorial (G1,G2,G3)- Problems related to Sample Spaces
5.	7/7/15	Probability Definitions and Axioms, Mathematical Model of Experiments.
6.	8/7/15	Probability as a Relative Frequency, Joint Probability.
7.	10/7/15	Conditional Probability, Total Probability
8.	11/7/15	Bayes' Theorem, Independent Events.
9.	8/7/15, 7/7/15, 10/7/15	Tutorial (G1,G2,G3)- Problems related to Bayes' Theorem
10.	14/7/15	**Random Variable:** Definition of a Random Variable, Conditions for a Function to be a Random Variable.
11.	15/7/15	Discrete, Continuous and Mixed Random Variables.
12.	17/7/15	Problems.
13.	15/7/15, 14/7/15, 17/7/15	Tutorial (G1,G2,G3)- Problems related to Random Variable
	UNIT -II: DISTRIBUTION & DENSITY FUNCTIONS AND OPERATION ON ONE RANDOM VARIABLE – EXPECTATIONS	
14.	21/7/15	**Distribution & Density Functions**: Distribution and Density functions and their Properties.
15.	22/7/15	Gaussian Random Variable Distribution and Density functions.
16.	24/7/15	Binomial, Poisson, Uniform, Random Variable Distribution and Density functions.
17.	25/7/15	Exponential, Rayleigh Random Variable Distribution and Density functions.
18.	22/7/15,21/7/15,24/7/	Tutorial (G1,G2,G3)- Problems related to Distribution and

	15	Density functions.
19.	28/7/15	Conditional Distribution,Conditional Density, Properties.
20.	29/7/15	Methods of defining Conditional Events and Problems.
21.	31/7/15	Problems.
22.	1/8/15	**Operation on One Random Variable – Expectations:** Introduction, Expected Value of a Random Variable, Expected value Function of a Random Variable.
23.	29/7/15, 28/7/15, 31/7/15	Tutorial (G1,G2,G3)- Problems related to Moments
24.	4/8/15	Moments about the Origin, Central Moments,Variance and Skew.
25.	5/8/15	Chebychev's Inequality, Characteristic Function and Problems.
26.	7/8/15	Moment Generating Function and Problems.
27.	8/8/15	Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable.
28.	5/8/15, 6/8/15, 7/8/15	Tutorial (G1,G2,G3)- Problems related to Transformations.
29.	11/8/15	Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable and problems.
30.	12/8/15	Problems.
	UNIT-III: MULTIPLE RANDOM VARIABLES AND OPERATIONS	
31.	14/8/15	**Multiple Random Variables**: Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution.
32.	12/8/15, 11/8/15, 14/8/15	Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning.
33.	18/8/15	Conditional Distribution and Density – Interval conditioning.
34.	19/8/15	Statistical Independence, Sum of Two Random Variables.
35.	21/8/15	Tutorial (G1,G2,G3)- Problems related to conditional density.
36.	22/8/15	Sum of Several Random Variables, Central Limit Theorem, Unequal Distribution.
37.	19/8/15, 18/8/15, 21/8/15	Tutorial (G1,G2,G3)- Problems related to Equal Distribution
38.	1/9/15	Problems.
39.	2/9/15	Problems.
40.	4/9/15	**Operations on Multiple Random Variables:** Expected Value of a Function of Random Variables: Joint Moments about the Origin.
41.	5/9/15	Joint Central Moments and Joint Characteristic Functions.
42.	2/9/15, 1/9/15, 4/9/15	Tutorial (G1,G2,G3)- Problems related to Joint Moments
43.	8/9/15	Properties of Joint Gaussian Random Variable.

44.	9/9/15	Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case
45.	11/9/15	Transformations of Multiple Random Variables.
46.	12/9/15	Linear Transformations of Gaussian Random Variables.
47.	9/9/15, 8/9/15, 11/9/15	Tutorial (G1,G2,G3)- Problems related to Gaussian Random Variables
	UNIT-IV: STOCHASTIC PROCESSES – TEMPORAL CHARACTERISTICS	
48.	15/9/15	The Stochastic Process Concept, Classification of Processes.
49.	16/9/15	Deterministic and Nondeterministic Processes, Distribution and Density Functions.
50.	18/9/15	Concept of Stationarity and Statistical Independence.
51.	19/9/15	First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity.
52.	16/9/15, 15/9/15, 18/9/15	Tutorial (G1,G2,G3)- Problems related to Stationarity
53.	22/9/15	Nth Order and Strict-Sense Stationarity, Time Averages and Ergodicity.
54.	23/9/15	Mean- Ergodic Processes.
55.	25/9/15	Correlation-Ergodic Processes, Autocorrelation Function and its Properties.
56.	26/9/15	Cross-Correlation Function and its Properties.
57.	23/9/15,22/9/15,25/9/15	Tutorial (G1,G2,G3)- Problems related to Ergodic Processes
58.	29/9/15	Covariance and its Properties.
59.	30/9/15	Linear System Response of Mean and Mean-squared Value.
60.	3/10/15	Autocorrelation Function, Cross-Correlation Functions.
61.	30/9/15, 29/9/15, -	Tutorial (G1,G2,G3)- Problems related to Cross-Correlation
62.	6/10/15	Gaussian Random Processes and Poisson Random Process.
63.	**UNIT-V: STOCHASTIC PROCESSES – SPECTRAL CHARACTERISTICS**	
64.	7/10/15	Power Spectrum and its Properties.
65.	9/10/15	Relationship between Power Spectrum and Autocorrelation Function.
66.	10/10/15	Cross-Power Density Spectrum Properties.
67.	7/10/15, 6/10/15, 9/10/15	Tutorial (G1,G2,G3)- Problems related to Cross-Power Density Spectrum
68.	13/10/15	Relationship between Cross-Power Spectrum and Cross-Correlation Function.

69.	14/10/15	Spectral Characteristics of System Response.
70.	16/10/15	Power Density Spectrum of Response.
71.	17/10/15	Problems
72.	14/10/15, 13/10/15, 16/10/15	Tutorial (G1,G2,G3)- Problems related to Cross-Power Spectral Density of Input and Output of a Linear System.

TEXT BOOKS :

1. Probability, Random Variables & Random Signal Principles- Peyton Z. Peebles, TMH, 4th Edition,2001(All units covered)
2. Probability, Random Variables and Stochastic Processes-Athanasios Papoulis and S.Unnikrishna Pillai, PHI, 4th Edition,2002

REFERENCES :

1. Probability and Random Processes with applications to Signal Processing-Henry Stark and John W.Woods,Pearson Education,3rd Edition
2. Statistical Theory of communication – S.P.Eugene Xavier,New Age Publications,2003

Name : Signature of the faculty with date:

HoD Signature: