

Bhoj Reddy Engineering College for Women: Hyderabad

Department of Electronics and Communication Engineering

Lesson plan of faculty member for the academic year 2019–20

Class: II B Tech

Branch-Section: ECE-A

Semester: I

Subject: Probability Theory and Stochastic Processes

Lectures per week: 3

Lecture Number	Topics to be covered	Date (s)
UNIT – I: Probability and Random Variable		
1	Set Theory	15 July 2019
2	Probability introduced through Sets and Relative Frequency	17 July 2019
	Experiments and Sample Spaces	
3	Discrete and Continuous Sample Spaces, Events	20 July 2019
4	Problems related to Sample Space	22 July 2019
5	Probability Definitions and Axioms, Mathematical Model of Experiments	24 July 2019
	Probability as a Relative Frequency, Joint Probability	
6	Conditional Probability, Total Probability	27 July 2019
7	Bayes' Theorem, Independent Events	31 July 2019
	Problems related to Bayes' Theorem	
8	Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables	3 August 2019
9	Distribution and Density functions and their Properties	5 August 2019
10	Problems related to Random Variable	7 August 2019
	Gaussian Random Variable Distribution and Density functions	
11	Binomial, Poisson, Uniform, Random Variable Distribution and Density functions	10 August 2019
12	Exponential, Rayleigh Random Variable Distribution and Density functions	14 August 2019
	Conditional Distribution, Conditional Density and its Properties	
13	Methods of defining Conditional Events and Problems	17 August 2019
Unit – II : Operation on Single & Multiple Random Variables – Expectations:		
14	Expected Value of a Random Variable, Function of a Random Variable	19 August 2019
15	Moments about the Origin, Central Moments, Variance and Skew	21 August 2019
	Chebychev's Inequality, Characteristic Function	
16	Moment Generating Function and Problems	26 August 2019
17	Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable	28 August 2019
	Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable and problems	
18	Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution	31 August 2019
19	Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning	4 September 2019
	Statistical Independence, Sum of Two Random Variables	
20	Conditional Distribution and Density – Interval conditioning	7 September 2019
21	Sum of Several Random Variables, Central Limit Theorem, Unequal Distribution	9 September 2019
22	Operations on Multiple Random Variables: Expected Value of a Function of Random Variables	11 September 2019
	Joint Moments about the Origin	

23	Joint Central Moments and Joint Characteristic Functions	16 September 2019
24	Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case	18 September 2019
	Linear Transformations of Gaussian Random Variable, Transformations of Multiple Random Variables	
UNIT-III: Random Processes – Temporal Characteristics		
25	The Random Process- Concept, Classification of Processes	21 September 2019
26	Deterministic and Nondeterministic Processes, Distribution and Density Functions	23 September 2019
27	Concept of Stationarity and Statistical Independence	25 September 2019
	First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity	
28	Nth Order and Strict-Sense Stationarity, Time Averages and Ergodicity	30 September 2019
29	Mean- Ergodic Processes	5 October 2019
30	Correlation-Ergodic Processes, Autocorrelation Function and its Properties	7 October 2019
31	Covariance and its Properties	9 October 2019
	Cross-Correlation Function and its Properties	
32	Gaussian Random Processes and Poisson Random Process	12 October 2019
33	Linear System: Response, Mean, Mean-squared Value of response	14 October 2019
UNIT-IV: Random Processes – Spectral Characteristics		
34	Power Spectrum and its Properties	16 October 2019
	Autocorrelation, Cross-Correlation Functions of inputs and outputs	
35	Relationship between Power Spectrum and Autocorrelation Function	19 October 2019
36	Cross-Power Density Spectrum Properties	21 October 2019
37	Spectral Characteristics of System Response	23 October 2019
	Relationship between Cross-Power Spectrum and Cross-Correlation Function	
38	Cross-Power Spectral Density of Input & Output of a Linear System, Power Density Spectrum of Response	
Unit- V : Noise Sources & Information Theory		
39	Resistive/Thermal Noise, Arbitrary noise source	28 October 2019
40	Average of Noise Figure of Cascaded network	30 October 2019
	Effective Noise Temperature ,Noise Figure Modeling of noise sources, Shannon Hartley law, Trade-off between bandwidth and SNR	
41	Narrow band noise and its quadrature representation	2 November 2019
42	Information rate, Entropy, Redundancy	4 November 2019
43	Shannon Fano coding	6 November 2019
44	Huffmann coding	9 November 2019
45	Variable length coding	11 November 2019
46	Channel capacity of discrete channel	13 November 2019

Text books:

1. Peyton Z Peebles,"Probability, Random Variables & Random Signal Principles", 4/e, TMH, 2001. (All Units are covered)
2. Athanasios Papoulis and S Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4/e, TMH, 2002.
3. H Taub, Schilling and Gautam Sahe, "Principles of Communication Systems", 3/e, TMH, 2008.

Name and signature of the faculty: Mr M Krishna Chaithanya ----

Name and signature of Head of the Department: Ms N Shribala ----