

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-C

Semester: I

Subject: Probability Theory and Stochastic Processes

Lectures per week: 3

Lecture Number	Topics to be covered	Date (s)
<b>UNIT – I: Probability and Random Variable</b>		
1	Set Theory	16 July 2019
2	Probability introduced through Sets and Relative Frequency	18 July 2019
	Experiments and Sample Spaces	
3	Discrete and Continuous Sample Spaces, Events	19 July 2019
4	Problems related to Sample Space	23 July 2019
5	Probability Definitions and Axioms, Mathematical Model of Experiments	25 July 2019
	Probability as a Relative Frequency, Joint Probability	
6	Conditional Probability, Total Probability	26 July 2019
7	Bayes' Theorem, Independent Events	30 July 2019
8	Problems related to Bayes' Theorem	1 August 2019
	<b>Random Variable:</b> Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables	
9	Distribution and Density functions and their Properties	2 August 2019
10	Problems related to Random Variable	6 August 2019
11	Gaussian Random Variable Distribution and Density functions	8 August 2019
	Binomial, Poisson, Uniform, Random Variable Distribution and Density functions	
12	Exponential, Rayleigh Random Variable Distribution and Density functions	9 August 2019
13	Conditional Distribution, Conditional Density and its Properties	13 August 2019
14	Methods of defining Conditional Events and Problems	16 August 2019
<b>Unit – II : Operation on Single &amp; Multiple Random Variables – Expectations:</b>		
15	Expected Value of a Random Variable, Function of a Random Variable	20 August 2019
16	Moments about the Origin, Central Moments, Variance and Skew	22 August 2019
	Chebychev's Inequality, Characteristic Function	
17	Moment Generating Function and Problems	23 August 2019
18	Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable	27 August 2019
19	Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable and problems	29 August 2019
	Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution	
20	Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning	30 August 2019
21	Conditional Distribution and Density – Interval conditioning	3 September 2019
22	Statistical Independence, Sum of Two Random Variables	5 September 2019
	Sum of Several Random Variables, Central Limit Theorem, Unequal Distribution	
23	<b>Operations on Multiple Random Variables:</b> Expected Value of a Function of Random Variables, Joint Moments about the Origin	6 September 2019
24	Joint Central Moments and Joint Characteristic Functions	17 September 2019
25	Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case	19 September 2019
	Linear Transformations of Gaussian Random Variable,	

	Transformations of Multiple Random Variables	
<b>UNIT-III: Random Processes – Temporal Characteristics</b>		
26	The Random Process- Concept, Classification of Processes	20 September 2019
27	Deterministic and Nondeterministic Processes, Distribution and Density Functions	24 September 2019
28	Concept of Stationarity and Statistical Independence	26 September 2019
	First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity	
29	Nth Order and Strict-Sense Stationarity, Time Averages and Ergodicity	27 September 2019
30	Mean- Ergodic Processes	1 October 2019
31	Correlation-Ergodic Processes, Autocorrelation Function and its Properties	3 October 2019
	Cross-Correlation Function and its Properties	
32	Covariance and its Properties	4 October 2019
33	Gaussian Random Processes and Poisson Random Process	15 October 2019
34	Linear System: Response, Mean, Mean-squared Value of response	17 October 2019
	Autocorrelation, Cross-Correlation Functions of inputs and outputs	
<b>UNIT-IV: Random Processes – Spectral Characteristics</b>		
35	Power Spectrum and its Properties	18 October 2019
36	Relationship between Power Spectrum and Autocorrelation Function	22 October 2019
37	Cross-Power Density Spectrum Properties	24 October 2019
	Relationship between Cross-Power Spectrum and Cross-Correlation Function	
38	Spectral Characteristics of System Response	25 October 2019
39	Cross-Power Spectral Density of Input & Output of a Linear System, Power Density Spectrum of Response	29 October 2019
<b>Unit- V : Noise Sources &amp; Information Theory</b>		
40	Resistive/Thermal Noise, Arbitrary noise source	31 October 2019
	Effective Noise Temperature ,Noise Figure Modeling of noise sources, Shannon Hartley law, Trade-off between bandwidth and SNR	
41	Average of Noise Figure of Cascaded network	1 November 2019
42	Narrow band noise and its quadrature representation	5 November 2019
43	Information rate, Entropy, Redundancy, Shannon Fano coding	7 November 2019
	Huffmann coding; Variable length coding, Channel capacity of discrete channel	
44	Discussion of previous question papers	8 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: Ms G Srilakshmi ----

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