

# Bhoj Reddy Engineering College for Women: Hyderabad

## Department of Electronics and Communication Engineering

Lesson plan of faculty member for the academic year 2020–21

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 &amp; Random Variable</b>		
1	Introduction to the Subject and Overview of Subject	1 September 2020
2	Probability introduced through Sets and Relative Frequency	4 September 2020
3	Experiments and Sample Spaces - Discrete and Continuous Sample Spaces	7 September 2020
4	Events , Probability Definitions and Axioms	8 September 2020
5	Joint Probability and Conditional Probability	11 September 2020
6	Total Probability, Bayes Theorem	14 September 2020
7	Numerical problems on Conditional Probability	15 September 2020
8	Numerical problems on Total Probability and Bayes Theorem	18 September 2020
9	Independent Events and Numerical problems on Independent Events	21 September 2020
10	Random Variable - Definition , Conditions for a function to become a Random Variable , Discrete, Continuous and Mixed Random Variables	22 September 2020
11	Distribution, Density functions and properties	25 September 2020
12	Binomial, Poisson, Uniform Random variables	28 September 2020
13	Gaussian , Exponential and Rayleigh Random variables	29 September 2020
14	Numerical problems on Binomial, Poisson, Uniform Random variables	5 October 2020
15	Numerical problems on Gaussian , Exponential and Rayleigh Random variables	6 October 2020
16	Methods of Defining Conditioning Event , Conditional Distribution and Density functions and properties	9 October 2020
<b>UNIT-II: Operations on Single and Multiple Random Variables</b>		
17	Expected value of Function of Random Variable , Moments about Origin - Central moments, Variance and Skew	12 October 2020
18	Chebychevs' Inequality, Characteristic Function , Moment generating function ,	13 October 2020
19	Transformations of a Random Variable , , Vector Random Variables , Joint Distribution function and its properties	16 October 2020
20	Marginal Distribution function , Density function, Joint Density function and its properties	26 October 2020
21	Conditional Distribution and Density functions	27 October 2020
22	Statistical Independence , Sum of Two Random variables	9 November 2020
23	Sum of Several Random variables , Central Limit Theorem	10 November 2020
24	Expected value of Function of Multiple Random variables , Joint Characteristic Function and Jointly Gaussian Random Variables	13 November 2020
25	Transformation of Multiple Random Variables, Linear Transformation of Gaussian Random variables	16 November 2020
<b>UNIT-III: Random Processes- Temporal Characteristics</b>		
26	Random Process Concept, Classification of Processes, Deterministic and Non-Deterministic Processes	17 November 2020
27	Stationarity and Independence - First Order, Second Order, Nth Order, Strict Sense and Wide Sense	20 November 2020
28	Time Average and Ergodicity- Mean Ergodic and Correlation Ergodic	23 November 2020
29	Autocorrelation function and its properties, Cross Correlation function and its properties	24 November 2020

30	Covariance function, Gaussian Random Process, Poisson Random Process	27 November 2020
31	Random Signal Response for Linear Systems : System Response-Convolution , Mean and Mean squared value	1 December 2020
32	Autocorrelation function of Response , Cross correlation function of Input and Output	4 December 2020
<b>UNIT-IV: Random Processes- Spectral Characteristics</b>		
33	Power Spectrum- Properties ,Relationship between Power Spectrum and Autocorrelation function	7 December 2020
34	Cross Power Density Spectrum and its properties	8 December 2020
35	Relationship between Cross Power Density Spectrum and Cross-Correlation function	11 December 2020
36	Power Density Spectrum of Response, Cross Power Density Spectrum of Input and Output	14 December 2020
<b>UNIT-V: Noise Sources &amp; Information Theory</b>		
37	Resistive/Thermal Noise Source , Arbitrary Noise Sources , Effective Noise Temperature	15 December 2020
38	Noise equivalent bandwidth , Average Noise Figures , Average Noise Figure of cascaded networks,	18 December 2020
39	Narrowband Noise , Quadrature representation of narrow band noise & its properties	21 December 2020
40	Entropy, Information rate,. Source coding: Huffman coding, Shannon Fano coding,Mutual information,	22 December 2020
41	Channel capacity of discrete channel , Shannon-Hartley law; Trade -off between bandwidth and SNR.	28 December 2020
42	Revision	29 December 2020

#### **Text books:**

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Principles of Communication systems by Taub and Schilling (TMH),2008

#### **Reference books:**

1. Random Processes for Engineers-Bruce Hajck, Cambridge unipress,2015
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, PHI, 4th Edition, 2002.
3. Probability, Statistics & Random Processes-K. Murugesan, P. Guruswamy, Anuradha Agencies, 3rd Edition, 2003.
4. Signals, Systems & Communications - B.P. Lathi, B.S. Publications, 2003.
5. Statistical Theory of Communication – S.P Eugene Xavier, New Age Publications

Name and signature of the faculty: S V M G Phani Kumar C ----

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