Lecture Plan: 15MAT213 Probability & Random Processes

Lecture No.	Topic
1	Introduction to Probability – Measures of probability – definitions
2	Theorems on probability (Addition, Multiplication and conditional)
3	Bayes Theorem – proof
4	Problems on probability and Bayes theorem
5	Introduction to random variables: Discrete and continuous random variables with examples
6	Probability mass function(PMF) and Probability density function (PDF) Cumulative distribution function (CDF)– properties
7	Problems on PMF/PDF/CDF
8	Problems on PMF/PDF/CDF
9	**Assignment/Quiz/Tutorial 1**
10	Mathematical Expectation – concept and properties
11	Variance and Standard deviation -simple problems
12	Moment generating function(MGF) –definition and properties
13	Binomial Distribution- MGF, mean and variance
14	Poisson Distribution- MGF, mean and variance
15	Simple Problems on the above distributions
	Periodical Test 1
16	Uniform Distribution- MGF, mean and variance
17	Exponential Distribution- MGF, mean and variance
18	Normal Distribution - Properties, mean and variance
19	Simple Problems on the above distributions
20	Two dimensional random variables – JPMF and JPDF
21	Marginal and conditional probability functions – Stochastic independence
22	Problems on JPMF and JPDF
23	Problems on JPMF and JPDF
24	Correlation– introduction to concepts
25	Correlation– examples based on JPMF/JPDF
26	**Assignment/Quiz/Tutorial 2**
27	Chebyshev's theorem- proof for continuous case
28	Problems on Chebyshev's Theorem
29	Central limit theorem (CLT – introduction to concept – theorems
30	Problems on Chebyshev's theorem and CLT
31	Random Processes – introduction
32	Classification – statistical properties – examples
33	Stationary processes – SSS/WSS processes
34	Examples on SSS/WSS processes
35	Properties of autocorrelation function – problems
36	Examples on WSS/Variance
37	Point process-Poisson process – concepts – properties
38	Mean-autocorrelation of Poisson Process – proof
39	Theorems on Poisson Process
40	Problems on Poisson process
41	Gaussian Process- First and Second order Process
42	Properties - Problems
	Periodical Test 2
43	The spectrum estimation – concepts
44	Mean ergodic theorem,
45	Sufficient condition for Mean ergodicity - Problems
46	Correlation ergodicity Problems
47	Power spectral density (PSD) – concepts- properties
48	Weiner Kinchine theorem
49	Problems on PSD
50	**Assignment/Tutorial 3**
51	Markov Process – Chain – concepts
52	Chapman Kolmogorov theorem, steady state probabilities
53	Classification of states
54	Problems on Markov chain
55	Problems on Markov chain