SEMESTER IV

19MAT205	PROBABILITY AND RANDOM PROCESSES	L-T-P-C: 3-1-0-4

Course objectives

To understand the concepts of basic probability and random variables.
To understand some standard distributions and apply to some problems.
To understand the concepts of random process, stationarity and autocorrelation functions.
To understand markov process and markov chain and related concepts.

Course Outcomes

CO1: Understand the basic concepts of probability and probability modeling.
CO2: Gain knowledge about statistical distributions of one and two dimensional random variables and correlations
CO3: Understand the basic concepts of stochastic processes and the stationarity.
CO4: Understand the purpose of some special processes
CO5: Gain knowledge about spectrum estimation and spectral density function

CO-PO Mapping

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-

Module I

Review of probability concepts - conditional probability- Bayes theorem.
Random Variable and Distributions: Introduction to random variable – discrete and continuous random variables and its distribution functions- mathematical expectations – moment generating function and characteristic function.

Module II

Binomial, Poisson, Geometric, Uniform, Exponential, Normal distribution functions (moment generating function, mean, variance and simple problems) – Chebyshev's theorem.

Module III

Stochastic Processes:
General concepts and definitions - stationary in random processes - strict sense and wide sense stationary processes - autocorrelation and properties- special processes – Poisson points, Poisson and Gaussian processes and properties- systems with stochastic inputs - power spectrum- spectrum estimation, ergodicity –Markov process and Markov chain, transition probabilities, Chapman Kolmogrov theorem, limiting distributions classification of states. Markov decision process.

Text Book(s)

Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers, (2005) John Wiley and Sons Inc.

A. Papoulis, and Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", Fourth Edition, McGraw Hill, 2002.

Reference Book(s)

J. Ravichandran, "Probability and Random Processes for Engineers", First Edition, IK International, 2015.

Scott L. Miller, Donald G. Childers, "Probability and Random Processes", Academic press, 2012.

Evaluation Pattern

Assessment	Internal	External
Periodical 1 (P1)	15	
Periodical 2 (P2)	15	
*Continuous Assessment (CA)	20	
End Semester		50

*CA – Can be Quizzes, Assignment, Projects, and Reports