

GUJARAT TECHNOLOGICAL UNIVERSITY

ELECTRONICS & COMMUNICATION (SIGNAL PROCESSING & COMMUNICATION) (41)

PROBABILITY AND RANDOM PROCESS

SUBJECT CODE:2714105

SEMESTER: I

Type of course: Application based maths relevant to branch

Prerequisite: - Required understanding of basics of signal analysis and probability.

Rationale: To acquaint with the concept of probability, Random processes and application in communication

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	PA (V)		PA (I)			
					ESE	OEP	PA	RP		
3	2	0	4	70	30	30	0	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	Probability and Random Variables Probability, Set Theory, Probability Space, Properties of probability, Probability of joint events, Conditional probability, Bay's rule, Independence, Mean & variance, Sum of random variables	10	20%
2.	Sample space, Distribution and densities, Characteristics functions and moment generating functions, Transformation of random variables, Conditional Expectations, Sequence of Random Variables, Convergence of sequence of random variables, Statistical independence, Uncorrelation of random variables, Joint and marginal densities functions of random variables.	20	50%
3.	Stochastic Processes and System Classes of Random process, Gaussian processes, Markov Processes, Stationary processes, Weiner processes, Stochastic calculus, the notion of a calculus for random functions, mean-square derivative and mean square integral of stochastic processes.	10	30%

Reference Books:

1. Alberto Leon Gracia, Probability and Random Processes for Electrical Engineer, 2nd Ed. P.E.India.
2. A.Papoulis and S.Unnikrishana Pillai, Probability Random Variables and Stochastic Processes, 2nd Ed. McGraw Hill.
3. W.Gardener, Stochastic Processes, McGraw Hill.
4. S.Haykin, Adaptive Filter Theory, Prentice Hall India.
5. B.P.Lathi, Modern Analog and Digital Communications, Oxford University Press.

Course Outcome:

After learning the course the students should be able to: To learn concepts of probability and random variables , analysis of random process, stochastic calculus , response of stochastic inputs with reference to communication signal and systems. The students will be able to correlate concepts with further courses on wireless communication and signal processing as well. This will lay down strong research foundation to read and understand research papers and carry out mathematical analysis during thesis.

List of Open Source Software/learning website:

www.nptel.ac.in