

22MYB06 – PROBABILITY AND RANDOM PROCESSES (Common to BME and ECE Branches)				
	L	T	P	C
	3	1	0	4
PRE-REQUISITE : NIL				
Course Objectives:	<ul style="list-style-type: none"> Develop probability distribution of discrete and continuous random variables, Joint probability distribution occurs in digital signal processing, design engineering and microwave engineering To learn about the classification of random processes and strict stationary, wide sense stationary and Ergodic, correlation functions and power spectral density and solve the signal problems. 			
Course Outcomes The Student will be able to		Cognitive Level	Weightage of COs in End Semester Examination	
CO1	Apply the basic principles of probability to solve the problems involving multiple events and practical problems in communication engineering, including signal processing and information theory.	Ap	30%	
CO2	Interpret the distribution to model and solve problems involving binary outcomes, such as error detection and correction in digital communications.	Ap	30%	
CO3	Determine and enhance problem-solving skills through practical examples, case studies, and applications in fields such as signal processing, time series analysis, and system modeling.	An	20%	
CO4	Analyze and interpret signals and their interactions in the frequency domain.	An	20%	
CO5	Demonstrate the methods to solve the spectrum estimation and spectral density function by using mathematical tools in analog communication.	Ap	Internal Assessment mode	

UNIT I – ONE DIMENSIONAL RANDOM VARIABLES	(9+3)
Probability: Random variable – Probability mass function – Probability density functions – Properties – Moments – Moment generating functions and their properties	
UNIT II - STANDARD DISTRIBUTIONS	(9+3)
Discrete distributions: Binomial, Poisson and Geometric distribution – Continuous distributions: Uniform, Exponential and Normal distribution and its properties.	
UNIT III – TWO DIMENSIONAL RANDOM VARIABLES	(9+3)
Joint distributions – Marginal distributions and conditional distribution – Covariance – correlation and Regression – Transformation of random variables – Central limit theorem (Excluding proof).	
UNIT IV – RANDOM PROCESSES	(9+3)
Definition and examples – first order, second order strictly stationary, wide-sense stationary and Ergodic process- Markov process – Binomial, Poisson processes.	
UNIT V – CORRELATION AND SPECTRAL DENSITIES	(9+3)

Auto correlation – Cross correlation – Properties –Power spectral density – Cross spectral density – Properties – Wiener – Khintchine relation (statement only) – Relationship between cross power spectrum and cross correlation function.

TOTAL (L:45+T:15) :60 PERIODS

TEXT BOOKS:

1. Veerarajan.T, "Probability, Statistics and Random Processes,"3rded.,NewDelhi,Tata McGraw-Hill,2008.
2. Venkatarama Krishnan, "Probability and Random Process,"2ndEdition,John Wiley & Sons , New Jersey,2016
3. Scott L. Miller and Donald Childers, "Probability and Random Processes with applications to Signal Processingand communications," Elsevier, 2012.

REFERENCES:

1. GubnerA.John, "Probability and Random Processes for Electrical and Computer Engineers", Cambridge University Press, Newyork, 2006.
2. Charles W. Therrien, Murali Tummala, "Probability and Random Process for Electrical and Computer Engineers", CRC Press, Newyork, 2012.
3. Singaravelu. A, Sivasubramanian, Ramaa, "Probability, Statistics and Random Processes," 2nd Edition, Meenakshi Publication, Chennai, 2003.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2												
2		2												2
3	3													2
4		2												2
5	3				2				3			2		
CO (W.A)	3	2			2				3			2		2

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