

VELAMMAL COLLEGE OF ENGINEERING & TECHNOLOGY, MADURAI-625 009
(AUTONOMOUS)
DEPARTMENT OF MATHEMATICS
2025-2026 EVEN SEMESTER

COURSE PLAN

Degree & Branch	B.E.
Course Code-Title	21MA206- PROBABILITY AND RANDOM PROCESSES
Batch	2024-2028
Year/Semester/section	II/ IV / A
Course Component	Inter Disciplinary
Name of the Instructor	Mr. K. Pitchaimani

	Topic to be covered	Text / Reference Book Page No.	Mode of Delivery	Teaching Aid	No. of periods	Cumulative No. of periods
UNIT I - PROBABILITY						
1.	Introduction		L+I	BB	1	1
2.	Axioms of Probability	T1 58-64	L+I	BB	1	2
3.	Conditional Probabilities,	T1 76-80	L+D+I	BB	1	3
4.	Total Probability , Baye's theorem	T1 80-82	L+D+ I	BB	2	5
5.	Random variables, Probability mass function Probability density function, Properties	T1 96-107 T1 142-144	L+D+ I	BB	2	7
6.	Moments, MGF and properties	T2 81-83	L+D+ I	BB	2	9
7.	Tutorial		T	-	3	12
UNIT II - STANDARD DISTRIBUTIONS						
8.	Introduction		L+I		1	13
9.	Binomial and Poisson Distributions	T1 117-134	L+ I	BB	2	15
10.	Geometric and Uniform Distributions	T1 144-146	L+ I	BB	2	17
11.	Exponential and Gamma Distributions	T1 170-174	L+ I	BB	2	19
12.	Normal Distribution	T1 156-163	L+D+ I	BB	1	20
13.	Functions of a random variable	R1 3.1-3.3	L+D+ I	BB	1	21
14.	Tutorial		T	BB	3	24
UNIT III - TWO DIMENSIONAL RANDOM VARIABLES						
15.	Introduction		L+ I	BB	1	25
16.	Joint Distributions-Marginal and Conditional Distributions	T1 199-212	L+ I	BB	2	27
17.	Covariance and Correlation	T1 214-220	L+ I	BB	1	28
18.	Linear Regression	T1 488-490	L+ I	BB	2	30
19.	Transformations Of Random Variables	R1 3.3-3.5	L+ D+I	BB	1	31
20.	Central limit theorem(without proof)	T1 232	L+ D+I	BB	2	33

21.	Tutorial		T	BB	1
UNIT IV - CLASSIFICATION OF RANDOM PROCESSES					
22.	Introduction		L+I	BB	1
23.	Definition and examples	T2 179-181	L+I	BB	1
24.	first order-second order-strictly stationary-wide sense stationary processes	T2 182-188	L+I+D	BB	2
25.	Ergodic processes	T2 189-192	L+I	BB	1
26.	Markov process	R1 7.45	L+I	BB	1
27.	Poisson and Normal processes	T2 201-206	L+I	BB	2
28.	Sine wave process	R1 7.14-7.16	L+D+I	BB	1
29.	Tutorial		T	BB	1
UNIT V - CORRELATION AND SPECTRAL DENSITIES					
30.	Introduction		L+I+D	BB	1
31.	Auto correlation functions, Cross correlation functions, Properties	T2 194-197	L+I	BB	1
32.	Power spectral density, Cross spectral density, Properties	T2 230-234	L+I+D	BB	1
33.	Wiener - Khintchine relation, Relationship between cross power spectrum and cross correlation function	T2 234-236	L+I	BB	1
34.	Linear time invariant system, System transfer function, Linear systems with random inputs	R3 7.4-7.6	L+I	BB	2
35.	Auto correlation and cross correlation functions of input and output.	R3 7.8-7.9	L+D+I		1
36.	Tutorial		T	BB	1

Text Book:

- T1. JAY.L. Devore, "Probability and Statistics for Engineering and the Science", 8th Edition, Cengage Learning India.
T2. Peebles, P.Z., "Probability, Random Variables and Random Signal Principles", 4th Edition, Tata McGraw Hill.
T3. Cooper, G.R., Mc Gillem, C.D., "Probabilistic Methods of Signal and System Analysis", 3rd Indian Edition, Wiley New Delhi, 2012.

Reference Book:

- R1. Miller, S.L. and Childers, D.G., —Probability and Random Processes with Applications to Signal Processing, 2nd Edition, Academic Press, 2004.
R2. Sheldon M. Ross, "Introduction to Probability Models", 11th edition, Academic Press, 2014
R3. Yates, R.D. and Goodman, D.J., "Probability and Stochastic Processes", 2nd Edition, Wiley India Pvt. Ltd, New Delhi, 2002.
R4. Veerarajan T, "Probability, Statistics and Random Processes with queueing theory and queueing networks", 2nd Edition, Wiley India Pvt. Ltd, New Delhi, 2012.

Course In-Charge

Course Coordinator

Module Coordinator

Department of Mathematics

Course Code-Title	21MA206 - PROBABILITY AND RANDOM PROCESSES (ECE)	L	T	P	C
		3	1	0	4

Course Objective	<ul style="list-style-type: none"> To explain the basic concepts in probability and random variables. To discuss the basics of random variables with emphasis on the standard discrete and continuous distributions. To make use of the basic concepts of two dimensional random variables. To use the basic concepts of random processes in engineering disciplines To explain the concept of correlation and spectral densities.
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Course Outcomes	<p>At the end of the course, learners will be able to</p> <p>CO1: Identify the basic concepts of Probability and Random variables.</p> <p>CO2: Experiment the performance of random variables in terms of distributions.</p> <p>CO3: Calculate the correlation and regression of two dimensional random variables.</p> <p>CO4: Make use of random processes concept in engineering disciplines</p> <p>CO5: Apply the concept of correlation and spectral densities and the significance of linear systems with random inputs.</p>
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NIT I	PROBABILITY AND RANDOM VARIABLES	12
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Axioms of probability, Conditional probability, Total probability, Bayes theorem, Random variables- Probability mass function- Probability density function-Properties-Moments- Moment generating functions and their properties.

NIT II	STANDARD DISTRIBUTIONS	12
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Binomial -Poisson -Geometric – Uniform-Exponential –Gamma and Normal distributions and their properties- Functions of a random variable.

NIT III	TWO DIMENSIONAL RANDOM VARIABLES	12
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Joint Distributions-Marginal And Conditional Distributions-Covariance-Correlation And Linear Regression- Transformations Of Random Variables-Central limit theorem(without proof).

UNIT IV	CLASSIFICATION OF RANDOM PROCESSES	12
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Definition and examples-first order-second order-strictly stationary-wide sense stationary and Ergodic processes-Markov process-Poisson and Normal processes-Sine wave process.

UNIT V	CORRELATION AND SPECTRAL DENSITIES	12
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Auto correlation functions – Cross correlation functions – Properties – Power spectral density – Cross spectral density – Properties-Wiener – Khintchine relation- Relationship between cross power spectrum and cross correlation function- Linear time invariant system – System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output.

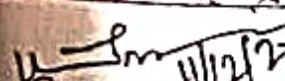
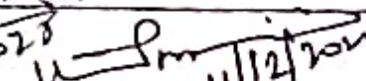
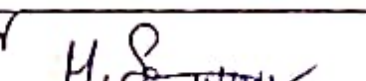
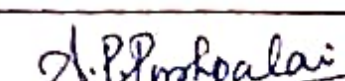
TOTAL: 60 PERIODS	
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TEXT BOOKS:

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REFERENCES:

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3. Yates. R.D. and Goodman. D.J., "Probability and Stochastic Processes", 2nd Edition, Wiley India Pvt. Ltd., Bangalore, 2012.

 **Course In-charge**
  **Course Coordinator**
  **Module Coordinator**
  **HOD/Maths**