MOHAMMED SATHAK A J COLLEGE OF ENGINEERING
Siruseri IT park, OMR, Chennai - 603103

LESSON PLAN

Department of ELECTRICAL AND ELECTRONICS ENGINEERING

Name of the Subject	PROBABILITY AND COMPLEX FUNCTION	Name of the handling Faculty	S. SUBRAMANIAN
Subject Code	MA3303	Year / Sem	II/III
Acad Year	2022-2023	Batch	2021-2025

Course Objective

This course aims at providing the required skill to apply the statistical tools in engineering problems.

To introduce the basic concepts of probability and random variables.

To introduce the basic concepts of two dimensional random variables

To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.

To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.

To acquaint the students with Differential Equations which are significantly used in engineering problems.

Course Outcome

Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon

.Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.

To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.

To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.

To acquaint the students with Differential Equations which are significantly used in engineering problems.

Lesson Plan

Sl. No.	Topic(s)	T / R* Book	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc)	Blooms Level (L1-L6)	CO	PO
	UNIT I PROBABILITY AND RANDOM VARIABLES						
1	Probability – Axioms of probability	T1	1	PPT/BB	L1	CO1	PO1,PO3
2	Probability – Axioms of probability	T1	1	PPT/BB	L2	CO1	PO1,PO3
3	Conditional probability	T1	1	PPT/BB	L2	CO1	PO1,PO3
4	Baye‘s theorem	T1	1	PPT/BB	L2	CO1	PO1,PO3
5	Discrete random variables-Problems	T1	1	PPT/BB	L1	CO1	PO1,PO3
6	Continuous random variables-Problems	T1	1	PPT/BB	L3	CO1	PO1,PO3

7	Moments	T1	1	PPT/BB	L2	CO1	PO1,PO3
8	Binomial Distribution.	T1	1	PPT/BB	L3	CO1	PO1,PO3
9	Poisson Distribution.	T1	1	PPT/BB	L3	CO1	PO1,PO3
10	Geometric Distribution & Uniform Distribution.	R1	1	PPT/BB	L3	CO1	PO1,PO3
11	Exponential Distribution & Normal distribution	R1	1	PPT/BB	L3	CO1	PO1,PO3
12	Function of Random variable	R1	1	PPT/BB	L3	CO1	PO1,PO3
Suggested Activity: Assignment							
Evaluation method :Assignment -1 given on Normal distribution							
	UNIT II	DIMENSIONAL RANDOM VARIABLES					
13	Introduction - Joint distributions.	T1	1	PPT/BB	L1	CO2	PO1,PO2,PO3
14	Marginal distributions.	T1	1	PPT/BB	L2	CO2	PO1,PO2,PO3
15	Conditional distributions.	T1	1	PPT/BB	L2	CO2	PO1,PO2,PO3
16	Covariance.	T1	1	PPT/BB	L2	CO2	PO1,PO2,PO3
17	Properties, Problems on Correlation	T1	1	PPT/BB	L2	CO2	PO1,PO2,PO3
18	Regression – properties.	T1	1	PPT/BB	L2	CO2	PO1,PO2,PO3
19	Problems on regression.	T1	1	PPT/BB	L3	CO2	PO1,PO2,PO3
20	Problems on regression.	T1	1	PPT/BB	L3	CO2	PO1,PO2,PO3
21	Problems on Transformation of random variables	T1	1	PPT/BB	L2	CO2	PO1,PO2,PO3
22	Problems on Transformation of random variables	R2	1	PPT/BB	L3	CO2	PO1,PO2,PO3
23		R2	1	PPT/BB	L3	CO2	PO1,PO2,PO3
Suggested Activity: Assignment							
Evaluation method :Assignment -2 given on Central Limit theorem							
	UNIT III	ANALYTIC FUNCTIONS					
25	Analytic function	T1	1	PPT/BB	L1	CO3	PO1,PO2
26	Necessary and sufficent condition in cartesian and polar coordinate	T1	1	PPT/BB	L2	CO3	PO1,PO2
27	Properties	T1	1	PPT/BB	L2	CO3	PO1,PO2
28	Harmonic Conjugates	T1	1	PPT/BB	L3	CO3	PO1,PO2
29	Construction of analytic function	T1	1	PPT/BB	L3	CO3	PO1,PO2
30	Conformal mapping	T1	1	PPT/BB	L3	CO3	PO1,PO2

31	Mapping by function W=Z+c,CZ,1\Z, Z2	T1	1	PPT/BB	L3	CO3	PO1,PO2
32	Bilinear Transformation	T1	1	PPT/BB	L3	CO3	PO1,PO2
Suggested Activity: Assignment							
Evaluation method :Assignment -3 given on Small sample with Large sample							
UNIT IV COMPLEX INTERGRAL							
37	Linear integral	T1	1	PPT/BB	L1	CO4	PO1
38	Cauchy's integral theorem	T1	1	PPT/BB	L3	CO4	PO1
39	Cauchy's integral formula	T1	1	PPT/BB	L3	CO4	PO1
40	toylors and Laurent's series	T1	1	PPT/BB	L3	CO4	PO1
41	Singularity, Residues	T1	1	PPT/BB	L3	CO4	PO1
42	Residues theorem	T1	1	PPT/BB	L3	CO4	PO1
43	for evaluation of real integrals	T1	1	PPT/BB	L3	CO4	PO1
43	Application of circular contor	T2	1	PPT/BB	L3	CO4	PO2
45	Semicicular	T1	1	PPT/BB	L3	CO4	PO3
Suggested Activity: Assignment							
Evaluation method :Assignment -5 given compare these topics with real time applications							
UNIT V ORDINARY DIFFERENTIAL EQUATION							
49	Higer order liner differental equation with constant coefficent	T1	1	PPT/BB	L1	CO5	PO1,PO3
50	Method of variation of parameter	T1	1	PPT/BB	L2	CO5	PO1,PO3
51	Homogeneous equation of Euler's and Legendre's type	T1	1	PPT/BB	L3	CO5	PO1,PO3
51	System of simultaneous linear first order differential equation with constant coefficient	T1	1	PPT/BB	L3	CO5	PO1,PO3
51	Method of undetermined coefficients	T1	1	PPT/BB	L3	CO5	PO1,PO3
Suggested Activity: Assignment							
Evaluation method :Assignment -5 given compare these topics with real time applications							
Content Beyond the Syllabus Planned							
1	Go to nearest village collect the required data frame the problem use F-distribution and solve it.						
2							
Text Books							
1	Johnson, R.A., Miller, I and Freund J., "Miller and Freund‘s Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.						
2	Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4th Edition, 2007.						
Reference Books							

1	Devore. J.L., "Probability and Statistics for Engineering and the Sciences‖, Cengage Learning, New Delhi, 8th Edition, 2014
2	Papoulis, A. and Unnikrishnapillai, S., "Probability, Random Variables and Stochastic Processes", McGraw Hill Education India, 4th Edition, New Delhi, 2010.
3	Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 3rd Edition, Elsevier, 2004
4	Spiegel. M.R., Schiller. J. and Srinivasan, R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition, 2004.
5	Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8th Edition, 2007.

Website / URL References

1	https://onlinecourses.nptel.ac.in
2	
3	

Blooms Level

Level 1 (L1) : Remembering Level 2 (L2) : Understanding Level 3 (L3) : Applying	Lower Order Thi	Fixed Hour Exams	Level 4 (L4) : Analysing Level 5 (L5) : Evaluating Level 6 (L6) : Creating		Higher Order Thinking	Projects / Mini Projects

Mapping syllabus with Bloom's Taxonomy LOT and HOT

Unit No	Unit Name	L1	L2	L3	L4	L5	L6	LOT	HOT	Total
Unit 1	PROBABILITY AND RANDOM VARIABLES	2	4	6	0	0	0	12	0	12
Unit 2	TWO DIMENSIONAL RANDOM VARIABLES	2	3	**7**	**0**	**0**	**0**	12	0	12
Unit 3	ANALYTIC FUNCTION	1	2	**9**	**0**	**0**	**0**	12	0	12
Unit 4	COMPLEX INTEGRAL	1	0	**11**	**0**	**0**	**0**	12	0	12
Unit 5	ORDINARY DIFFERENTIAL EQUATIONS	1	1	**10**	**0**	**0**	**0**	12	0	12
Total		7	10	43	0	0	0	60	0	60
Total Percentage		11.667	16.66666667	71.67	0	0	0	100	0	100

CO PO Mapping

	PO1	PO2	PO3	PO4	PO	PO6	PO7	PO8	PO9	PO10	PO	PO1	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	0	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	0	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	0	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-	0	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-	0	-
Avg	3	3	3	-	-	-	-	-	-	-	-	-	0	-

Justification for CO-PO mapping

CO1	Understand the fundamental knowledge of the concepts of probability and have knowledge ofstandard distributions which can describe r
CO2	Understand the basic concepts of one and two dimensional random variables and apply inengineering applications.

CO3	**To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.**
CO4	**To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.**
CO5	**To acquaint the students with Differential Equations which are significantly used in engineeringproblems.**

3	**High level**	**2**	**Moderate level**	**1**	Low level

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