Community College of Skill Development

Lesson Plan: DESCRIPTIVE STATISTICS

Program: PGDSA **Semester: 1st** **Course Code: DSP-103-V** **Credits: 3**

Course Objectives: The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science like disease modeling, climate prediction and computer networks etc.

Course Outcomes: At the end of the course, the student shall be able to:
CO1. Understand and apply basic concepts of probability, including conditional probability and Bayes' Theorem, to real-world data science problems..
CO2.Differentiate between discrete and continuous random variables, and analyze key probability distributions (such as Binomial, Poisson, and Normal) relevant to data modeling.
CO3. Compute and interpret statistical measures such as covariance and correlation to identify relationships between variables in datasets.
CO4. Analyze and derive joint, marginal, and conditional probability distributions to understand multivariate data behavior.

Equipment required in Classroom/ Laboratory/ Workshop

i. LCD/Projector
ii. Whiteboard/ Black Marker

Assessment Scheme

S.No.	Criteria	Marks
1	End Term Examination	75
2	Internal Evaluation Scheme	25
2a	Class Tests	15
2a (i)	Class Test-I	7.5

2a (ii)	Class Test-II	7.5
2(b)	Teacher Assessment (Continuous Evaluation)	10
2b (i)	Attendance	5
2b (ii)	Assignment / Presentation	5

Lecture No.	Topic Covered	Pedagogy	Date of Implementation	Course Outcomes Covered	Faculty Sign
1.	Basic Probability Concepts (Experiment, Sample Space, Events, Axioms) Type of Events	Lecture using real-life examples, Venn diagram explanation. Solving numerical problems.	**4-08-2025**	Understand fundamental probability concepts Apply conditional probability and Bayes' theorem to problems	
2.	Empirical & Classical Probability Theorems on Addition and Multiplication of probabilities.		**8-08-2025**		
3.	Conditional Probability & Bayes' Theorem		**18-08-2025**		
4.	Random variables and its types. Discrete Random variable - PMF, CDF & their properties	Whiteboard+ PPT	**22-08-2025**	Understand and compute parameters for discrete random variables	
5.	Expectation and Variance. Theorems on E[X] & Var[X]		**1-09-2025**		
6.	Moments (Raw & Central moments) & their relationship	Using graphical methods like histogram & distribution plots.	**5-09-2205**	compute and interpret moments, skewness, and kurtosis to understand the shape and characterist	
7.	Skewness & Kurtosis		**8-09-2025**		

				ics of data distribution s."	
8.	Joint, marginal & conditional probability of two random variables	Explanation by Venn diagram & tables	**12-09-2025**	Understand the relationship between two variables.	
9.	Correlation & covariance	Whiteboard+ PPT	**15-09-2025**		
10.	Discrete Random variable (binomial & Bernoulli distribution)		**19-09-2025**	Identify and use binomial, Poisson & hyper geometric distribution s	
11.	Uniform Distribution & derivation of their mean & variance		**3-10-2025**		
12.	Poisson distribution, Poisson as limiting case of binomial.		**6-10-2025**		
13.	Hypergeometric Distribution, Recurrence relation of binomial & Poisson.		**13-10-2025**		
14.	Continuous random variables (PDF, CDF) & their properties			Understand PDF and CDF, compute mean and variance	
15.	Graphical representation of PDF & CDF, E[X] & Var[X]				
16.	Measure of location & dispersion.	Diagram based explanation		Compute and interpret moments, skewness, and kurtosis to understand the shape and characterist ics of data distribution s."	
17.	Skewness & Kurtosis of Continuous random variables				
18.	Raw & Central moments of Continuous random variables	Whiteboard+ PPT			

19.	Continuous random variables (Uniform distribution & it's mean, variance)			Apply uniform, exponential & normal distribution in data analysis	
20.	Exponential (location scale parameter)				
21.	Normal distribution (mean & variance)				
22.	Memory less property of exponential & normal distribution				
23.	Properties of normal curve				
24.	Normal approximation to Poisson & binomial distribution				
25.	Normal table and its use.				

Text/Reference Books:

(i) Fundamentals of Mathematical Statistics by S.C. Gupta & V.K. Kapoor
Publisher: Sultan Chand & Sons
(ii) Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross
(iii) Applied Statistics and Probability for Engineers by Douglas C. Montgomery & George C. Runger