Indraprastha College for Women
University of Delhi

Course Name:	B.Sc. (H) Mathematics
Paper Title:	DSC-3: Probability and Statistics
Unique Paper Code:	2352011103
Semester:	I
Faculty(s):	Monika Bansal
Year:	2024

Work Plan			
Unit No.	Learning Objective	Lecture No.	Topics to be Covered
I	To familiarise students with: Basic statistical concepts and tools which are needed to study situations involving uncertainty or randomness. The course intends to render the students to several examples and exercises that blend their everyday experienceswith their scientific interests to form the basis of data science.	1	History of probability, Intro to Descriptive stats, Sample space,s Events.
		2	Sample spaces, Events.
		3	Probability axioms and properties.
		4	Probability axioms and properties.
		5	Probability axioms and properties. Conditional probabilities, Baye's Theorem and Independent events.
		6	Conditional probabilities, Baye's Theorem and Independent events.
		7	Discrete Random Variables, Discrete and Probability distributions, Expected Values
		8	Probability distributions with their mean and variance: Uniform, Bernoulli, Binomial Distribution
		9	Binomial Distribution, geometric, Poisson
		10	Poisson distribution, Poisson Distribution as a limit

		11	Hyper Geometric, Negative Binomial
		12	Ch- 1: Devore
		13	Stem-and-Leaf Display, Dotplots
		14	Measures of Location and variability
		15	Histograms, Boxplots
Unit 2	Continuous Probability Distributions:	16	Continuous random variables
		17	PDF, Uniform distribution,
		18	PDF, Uniform distribution,
		19	PDF, Uniform distribution,
		20	Continuous random variables
		21	Continuous random variables
		22	CDF and expected values
		23	CDF and expected values
		24	CDF and expected values
		25	Normal and standard Normal distributions with their percentiles.Approximating the binomial distribution, exponential Distribution,
		26	Normal and standard Normal distributions with their percentiles.Approximating the binomial distribution, exponential Distribution,
		27	Normal and standard Normal distributions with their percentiles.Approximating the binomial distribution, exponential Distribution,
		28	Lognormal distribution
		29	Lognormal distribution
		30	Lognormal distribution
Unit 3	Central limit theorem and Regression Analysis	31	Sampling distribution and standard error of the sample mean,
		32	Sampling distribution and standard error of the sample mean,
		33	Central Limit Theorem and applications
		34	Central Limit Theorem and applications

		35	Scatter plot of bivariate data, Regression Line
		36	Regression Line using principle of least squares(statement and Normal eqns.)
		37	Regression Line using principle of least squares(statement and Normal eqns.)
		38	Regression Line using principle of least squares(statement and Normal eqns.)
		39	Predicted Values and the residuals
		40	Error sum of squares
		41	Coefficient of determination
		42	Sample correlation coefficient and its properties
		43	Coefficient of determination
		44	Sample correlation coefficient and its properties
		45	doubts

Syllabus		
Unit	**Contents**	**Contac t Hours**
I	Descriptive Statistics, Probability and Discrete Probability Distributions: Descriptive Statistics: Populations, Samples, Stem-and- Leaf Displays, Dotplots,Histograms, Qualitative Data, Measures of Location, Measures of Variability, Boxplots; Sample spaces and Events, Probability axioms and properties, Conditional probability, Independent events, Baye's Theorem; discrete Random variables and Probability distributions, Expected Values, Probability distributions: Binomial, geometric,hypergeometric, negative Binomial, Poisson and Poisson Distribution as a limit.	15
II	Continuous Probability Distributions: Continuous random variables, probability density functions, Uniform distribution, Cumulative distribution functions and expected values, the Normal, exponential and lognormal distributions. tion and regression for two variables, Weak law of large numbers and ce for independent and identically distributed random variables.	15

III	Central limit theorem and Regression Analysis: Sampling distribution and standard error of the sample mean, Central Limit Theorem and applications;Scatterplot of bivariate data, Regression Line using principle of Least squares, Estimation using the regression Lines, Sample correlation coefficient and properties.	15
	Total	**45**

Text Books/Suggested Readings:

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1.	Devore, Jay L., (2016)Probability and Statistics for Engineering and the Sciences (9th ed.), Cengage Learning India Private Limited. Delhi, Indian Reprint 2020	2016/2020
2.	Mood, A. M., Graybill, F.A., & Boes, D.C.,(1974) Introduction to the Theory of Statistics(3rd ed.), Tata McGraw-Hill Pub. Co.Ltd. Reprinted 2017	1974/2017

	Paper Components		
Credits	**Lecture (L)**	**Tutorial (T)**	**Practical (P)**
6	**3**	**0**	**6**

Assessment Scheme

S.No.	Component	Marking Scheme	Total Marks
1	Internal Assessment		**30**
	• Assignment/Quiz/Project/ Presentation	12	
	• Class Test	12	
	• Attendance	6	
2.	Continuous Assessment (**Tutorial)**		NA
	• Activity 1	NA	
	• Activity 2	NA	
	• Attendance	NA	
3.	Practical		40
	• Continuous Assessment	10	

	• End Term Written/Practical Exam • Viva	20 10	
4.	End Semester Examination		90