M. G. Science Institute, Ahmedabad

Autonomous | Affiliated to Gujarat University, Ahmedabad

(Managed by The Ahmedabad Education Society)

Department of Statistics

Bachelor of Science (Hons.) in Statistics B.Sc. (Hons.) Statistics 4 Year, 8 Semester Full-Time Programme Choice Based Credit System (CBCS) & Grading System Outcome-Based Education Pattern (Effective from Academic Year 2024-25)



Semester: III			Course Title: Probability Distribution-I	Credit: 4			
Course No.: STM231			·	Hours: 4/week			
Course Outcomes: On successful completion of the course the learner will be able to							
СО	COGNITIVE		COURSE OUTCOMES				
	ABILITIES						
CO 1	REMEMBERING		Recall the basic concept of probability distributions, including pmf,				
			pdf, and cumulative distribution functions.				
CO 2	UNDERSTANDING		Understand the concept of discrete and continuous probability				
			distributions and their properties.				
CO 3	APPLYING	Apply probability distributions to solve real-life problems					
			including calculating probabilities and expected v	alues.			
CO 4	ANALYSING	r	Analyse and compare different probability distrib	utions to select the			
			appropriate model for specific real-life application	ns.			
CO 5	EVALUATIN	G	Evaluate the suitability and performance of proba	bility distribution			
			models in representing data.				
CO 6	CREATING		Develop probabilistic models using appropriate p	robability			
			distributions to address complex problems in a pr	actical context.			

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3				2
CO 2	2			2	2
CO 3	3	2		2	
CO 4	3	3	2	3	
CO 5	2		3	2	
CO 6	3	2	2		2

Unit	Detailed Syllabus	No. of
		Hours of
		Teaching
Ι	Discrete Probability Distributions-I	15
	Discrete Uniform Distribution: Definition, Mean and variance,	
	MGF.	
	Bernoulli Distribution: Definition, Moments, Applications.	
	Binomial Distribution: Derivation and Definition, First Four	
	Moments, Generating Functions, Properties and Applications.	
	Poisson Distribution: Derivation and Definition, First Four	
	Moments, Generating Functions, Properties and Applications.	
	Hypergeometric Distribution: Definition, Mean, Variance and	
	Applications	
II	Continuous Probability Distributions-I	15
	Rectangular Distribution: Definition, Distribution Function, r th raw	
	moment, First Four Moments, Mean Deviation about mean, MGF.	
	Exponential Distribution: Definition, Mean and Variance, Distribution	
	Function, MGF, Memoryless Property.	
	Beta Type-I Distribution: Definition, Mean, Mode, Variance, Harmonic	
	Mean	

	Beta Type-II Distribution: Definition, Mean, Mode, Variance,	
	Harmonic Mean	
III	Normal Distribution: Definition, First Four moments, Mean Deviation	15
	about Mean, Median, Mode, MGF, Central MGF, coefficient of	
	Skewness, coefficient of Kurtosis, Properties of Normal Distribution,	
	Standard Normal variate, its interpretation, Standard Normal Distribution	
	and its properties.	
IV	Truncated Distributions:	15
	Truncation Meaning and use, types of truncations	
	Truncated distribution as conditional distribution, truncation to the right,	
	left, and on both sides.	
	Binomial distribution $B(n p)$ left truncated at $X = 0$, (value zero not	
	observable), its p.m.f, mean, variance.	
	Poisson distribution $P(\lambda)$ left truncated at $X = 0$ (value zero not	
	observable), its p.m.f, mean, variance.	
	Normal distribution N(μ , σ 2) truncated (i) to the left of X = a, (ii) to the	
	right of $X = b$, (iii) to the left of $X = a$, and (iv) to the right of $X = b$, its	
	p.d.f.	
	Examples and problems on Truncated Binomial Distribution and	
	Truncated Poisson Distribution, Truncated Normal Distribution	

Suggested Reference Books:

- 1. Applied Statistics, Publisher: Books & Allied (P) Ltd. Mukhopadhyay P. (2015).
- 2. Hogg, R.V. and Craig, A.T. (1972): Introduction to Mathematical Statistics, Amerind Publishing Co.
- 3. Mood, A.M., Greybill, F.A. and Bose, D.C. (1974): Introduction to the Theory of
- 4. Statistics, McGraw Hill.
- 5. Mukhopadhyay, P. (1996): Mathematical Statistics, New Central Book Agency.
- 6. Rohtagi, V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley and Sons.
- 7. Hoel, P.G. (1971): Introduction to Mathematical Statistics, Asia Publishing House.
- 8. Meyer, P.L. (1970): Introductory Probability and Statistical Applications, Addison Wesley.
- 9. Gupta, S.C., and Kapoor, V.K. Fundamentals of Mathematical Statistics, Sultan Chand Publications.
- 10. Goon, A.M., Gupta, M.K. and Das Gupta, B. (1991): Fundamentals of Statistics, Vol. I, World Press, Calcutta.
- 11. A First Course in Probability Sheldon. M. Ross, (Mc Millian Publishing Co.)
- 12. Introduction to Probability and Statistics for Engineers and Scientists-S.M. Ross (Elsevier)