SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2021-2022

MASTER OF SCIENCE IN APPLIED STATISTICS
M. Sc. Applied Statistics, Semester I

Course Code	PS01CAST51	Title of the Course	STATISTICAL DISTRIBUTIONS AND THEIR APPLICATIONS
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To present the general theory of statistical distributions as well as the standard distributions found in statistical practice.
	2. To train students with essential tools for statistical analyses at the post graduate level.
	3. Fostering understanding through real-world statistical applications.

Course Content

Unit	Description	Weightage (in %)
I	Random Experiments. Random Variables, Probability functions – probability mass and probability density function (pmf and pdf), Cumulative Distribution Function (cdf), Survival Function, Probability Generating Functions, Moments and moment Generating Funtions, Cumulants, Characteristic Functions.	25
II	Discussion on cases (real life examples) related to Binary (Bernoulli) random variables. Introduction of Bernoulli distribution and study of some properties of Bernoulli Distributions (like moments, cumulants, mean, variance, moment and cumulant generating functions, probability generating function etc). Binomial Distribution, Poisson Distribution, Geometric Distribution, Negative Binomial Distribution, Hyper geometric Distribution- Probability functions, some properties and applications. Mutinomial distribution -Probability function, properties and some applications.	25
III	Exponential Distribution, Weibull Distribution, Gamma Distribution, Laplace Distribution, Cauchy Distribution and Normal Distribution, Chi-square Distribution and F –Distribution - Probability functions, properties and some applications.	25
IV	Bivariate and Multivariate Distributions – Bivariate exponential, Bivariate Normal and Multivariate Normal Distribution – Probability functions, properties and applications.	25

Teaching-Learning Methodology	Interactive Class Lectures

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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	understand various random variables, their univariate and multivariate probability distribution, moments, Compute marginal and conditional distributions from joint distributions.
2.	understand the elements of reliability, hazard function, its applications, and the concept of censoring, life distributions and ageing classes
3.	familiarity with the notion of Survival Function, its relationship with the cumulative distribution function, and other generating functions.
4.	understand the concept of sampling distributions from normal populations and applications

Suggested References:	
Sr. No.	References
1.	Berger, R. and Casella G. (2002). *Statistical Inference*, Duxbury Resource Center, Second Edition.
2.	Dasgupta, A. (2010). *Fundamentals of Probability: A First Course*, Springer, New York.
	Hogg, R. V. McKean, J. W. and Craig, T. T. (2005). *Introduction to Mathematical Statistics*, Sixth Edition, Pearson Prentice Hall, New Jersey.
3.	Rao, C. R. (2002). *Linear Statistical Inference and Its Applications*, Second Edition, Wiley, New York.
4.	Rohatgi, V. K. & A. K. M. E Saleh (2001). *Introduction to Probability and Statistics*, Wiley, New York.
5.	Gibbons, J. D. and Chakraborti, S. (1992). *Nonparametric Statistical Inference*, Third

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	Edition, Marcel.
6.	Balakrishnan, K. (1996). *Exponential Distribution: Theory, Methods and Applications*, CRC Press.
7.	Samuel Kotz, N. Balakrishnan, Norman L. Johnson (2000). *Continuous Multivariate Distributions*, Volume 1, Models and Applications, 2nd Edition, Wiley.

On-line resources to be used if available as reference material
On-line Resources

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