



(Master of Science in Statistics) (Master of Science)
(M. Sc.) (Statistics) Semester (I)

Course Code	PS01CSTA53	Title of the Course	DISTRIBUTION THEORY
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	<ol style="list-style-type: none"> 1. To learn important univariate and multivariate discrete and continuous distributions and their properties, this will be useful for other subjects of Statistics. 2. To know method for approximation of distributions of complex sample functions. 3. To know theory of order statistics, properties of order statistics and their applications in parametric and non-parametric inference.
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Course Content		
Unit	Description	Weightage* (%)
1.	Compound, truncated and mixture distributions. Transformation of variables. Sampling distributions of statistics from univariate normal random samples - Non-central χ^2 , t and F distributions and their properties. Regression, multiple and partial correlation coefficients and their inter-relationship (To be covered along with or after Unit IV).	25
2.	Multinomial distribution, marginal and conditional distributions, it's multiple and partial correlation coefficients. Transformation of statistics, Approximation of distributions of statistics, δ -Method with illustrations.	25
3.	Order statistics: their distributions and properties. Joint and marginal distributions of order statistics. Probability integral transformation, Rank orders and their exact null distributions. One and two sample examples of rank statistics such as sign statistic, Wilcoxon signed rank statistics, Wilcoxon two sample statistics etc., Extreme values and their asymptotic distributions (statement only) with applications.	25
4.	Bivariate normal distribution, Distributions of correlation coefficient and regression coefficient. Multivariate normal distributions and their properties, Distributions of linear and quadratic functions under	25





	normality and related distribution theory. Fisher-Cochran theorem.	
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Teaching-Learning Methodology	
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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	
1.	have knowledge of various absolute and mixture distributions.
2.	have knowledge on non-central sampling distributions, their properties and roll in testing of hypotheses.
3.	be able to approximate bias and standard errors of complex functions using δ -Method.
4.	know order statistics, rank order statistics and their usefulness in parametric and non-parametric inference.
5.	have basic knowledge on distributions of multinomial, multivariate normal and quadratic forms, and their important properties.

Suggested References:	
Sr. No.	References
1.	Johnson, N. L., Kotz, S. and Balakrishnan, N. (1995) Continuous Univariate Distributions, Vol.1 & 2, 2nd Edition





2.	Hogg, R. V. McKean, J. W. Craig A. T. (2013) Introduction to Mathematical Statistics, Pearson, 7th Edition
3	Rohatgi, V. K. .Saleh A.K. Md. E (2015). Introduction to Probability Theory and Mathematical Statistics, Wiley, 3rd Edition
4	Rao, C. R. (1995) Linear Statistical Inference and Its Applications (Wiley Eastern) Second Edition
5	Cramer, H. (1946) Mathematical Methods of Statistics, (Princeton). 5. Stuart, A. and Ord, J.K. (2010)
6	Kendall's Advanced Theory of Statistics (VI Ed.) Distribution Theory, Vol. I, Wiley. 6. Mood, A. M., Graybill, F. A. and Boes, D. C. (1974). Introduction to the Theory of Statistics, McGraw-Hill
7	Mukhopadhyaya, P. (2009). Mathematical Statistics, 2 nd . ed., Book and Allied (P) Ltd, Kolkata, India

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

On-line Resources

