(Mater of Science in Statistics) (Master of Science)
(M. Sc.) (Statistics) Semester (II)

Course Code	PS01CSTA54	Title of the Course	TESTING OF HYPOTHESES
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	1. To known fundamental theories of various approaches for construction of confidence sets and testing of parametric and non-parametric hypotheses 2. Applications of these methods to various distributions.

Course Content		
Unit	Description	Weightage* (%)
1.	Randomized test, randomized version of Neyman-Pearson lemma and its generalization. Uniformly most powerful tests for one sided alternative for one parameter exponential class of densities and extension to the distributions having monotone likelihood ratio property.	25
2.	Unbiased tests, its applications to one-parameter exponential family of distribution, Similar tests, UMP similar tests, test with Neyman structure, UMP unbiased tests for parameters of normal distribution, Confidence bounds: Neyman's principal of confidence bounds, uniformly most accurate and uniformly most accurate unbiased confidence bounds.	25
3.	Likelihood Ratio Test (LRT), large sample properties: consistency of tests, asymptotic distribution of LRT, Chi-square goodness of fit test. Sequential Probability Ratio Test (SPRT), properties of SPRT, the fundamental identity of SPRT and its use in derivation of OC and ASN functions.	25
4.	U-statistics, properties and asymptotic distributions (in one and two samples cases). One sample problem : Kolmogorov-Smiirnov test, Location problem. Wilcoxon signed-rank test. Two sample problem: Wilcoxon-Mann-Whitney test.	25

Teaching-Learning Methodology	

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.	understand basic concepts of testing of hypothesis.
2.	be able to distinguish among various approaches of testing of hypotheses.
3.	be able to understand well-known tests, their properties and applications to one and multi-parameter distributions.
4.	have basic knowledge on theory of U-statistics and their applications in non-parametric inference.

Suggested References:	
Sr. No.	References
1.	Dudewicz, E. J. and Mishra, S.N.(1988) Modern Mathematical Statistics
2.	Ferguson, T. S. (1967): Mathematical statistics (A decision theoretic approach), Academic Press.
3	Gibbons, J. D. and Chakraborti, S. (2003) Nonparametric statistical Inference (Third Edition) Marcel Dekker, New York, 4th Edition
4	Kale, B. K. and Muralidharan, K. (2015).Parametric Inference: An Introduction, Alpha Science International Ltd.
5	Kendall, M. G. and Stuart, A. (1979) : The Advanced Theory of Statistics, Vol. 2, (IV edition), Griffin, London.
6	Lehmann, E. L. (1986) Testing of Statistical hypothesis (John Wiley)

7	Mood, A. M., Graybill, F. A. and Boes, D. C. (1974). Introduction to the Theory of Statistics, McGrow-Hill Page 18 of 39
8	Patel S. R. (2021). Classical and Bayesian Inference, IK International, New Delhi
9	Rajagopalan, M. and Dhanavanthan, P (2012). Statistical Inference, PHI, New Delhi
10	Rohatgi, V. K. (1976) Introduction to theory of probability and Mathematical Statistics
11	Sahu, P. K., Pal, S. R. and Das, A. K. (2015) Estimation and Inferential Statistics, Springer India
12	Srivastava, M, Khan, A. K. and Srivastava, N (2012). Statistical Inference (Theory of Estimation), PHI, New Delhi

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

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