Semester	**FIVE**
Course	**Major (Paper 1)**
Paper Code	**C3ST230511T**
Paper Title	Statistical Inference II
No. of Credits	**4**
Theory/Composite/ Practical	**Theory**
Minimum No. of preparatory hours per week a student has to devote	**4**
Number of Module	**TWO**
Syllabus	**Module-I** Sufficiency, Completeness and Exponential family of distributions. [6L] Factorization theorem. Minimum variance unbiased estimator (MVUE), Rao-Blackwell and Lehmann-Scheffe theorems and their applications. [10L] Cramer-Rao inequality and MVB estimators [4L] Maximum Likelihood Estimator and its properties. [6L] **Module-II** Most powerful test, uniformly most powerful test, Neyman Pearson Lemma (statement and applications to the construction of most powerful test), Unbiased test. [9L] Likelihood Ratio test and its properties. (without proof) [10L] Sequential Probability Ratio Test (SPRT) for simple vs simple hypotheses. Fundamental relations among α, β, A, and B. [statement only] [3L] Wald's fundamental identity. Operating Characteristics (OC) and Average Sample Number (ASN) functions [statement only]. Problems based on Normal, Poisson, Binomial, and Exponential distributions. [4L]
Learning Outcomes	○ To understand the basic notions and methods of point estimation. ○ To understand the notion of MVUE. ○ To know the different methods to generate MVUE. ○ To understand the Neyman Pearson approach to tests of significance. ○ To understand the likelihood approach to tests of significance and its general applicability. ○ To understand the link between the Neyman Pearson and likelihood approach. ○ To understand the basic difference between a fixed sample approach and the sequential approach to testing of hypotheses.
Reading/Reference List	1. Goon A.M., Gupta M.K.: Das Gupta. B. (2005), Fundamentals of Statistics, Vol. I, World Press, Calcutta. 2. Rohatgi V. K. and Saleh, A.K. Md. E. (2009): An Introduction to Probability and Statistics. 2ndEdn. (Reprint) John Wiley and Sons. 3. Miller, I. and Miller, M. (2002): John E. Freund's Mathematical Statistics (6th addition, low price edition), Prentice Hall of India. 4. Dudewicz, E. J., and Mishra, S. N. (1988): Modern Mathematical Statistics. John Wiley & Sons.

<table>
<tr><td></td><td colspan="2"><ol start="5">
Mood A.M, Graybill, F.A., and Boes, D.C (2001): Introduction to the Theory of Statistics, McGraw Hill, New Delhi.
Bhat B.R, Srivenkatramana T and Rao Madhava K.S. (1997) Statistics: A Beginner's Text, Vol. I, New Age International (P) Ltd.
Snedecor G.W and Cochran W.G.(1967) Statistical Methods. lowa State University Press.</td></tr>
<tr><td>Evaluation</td><td colspan="2">CIA: 30
End-Sem: 70
Total: 100</td></tr>
<tr><td rowspan="2">Paper Structure for Theory Semester Exam</td><td>Module-I (35 marks)</td><td>Module-II (35 marks)</td></tr>
<tr><td>To answer Short: 4 out of 6 (5 marks)
Long: 1 out of 2 (15 marks)</td><td>To answer Short: 4 out of 6 (5 marks)
Long: 1 out of 2 (15 marks)</td></tr>
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