STS622J2 STATISTICS _ STATISTICAL INFRENCE

CREDITS: 4 THEORY +2 PRACTICAL
THEORY: 60 HOURS & PRACTICAL: 60 HOURS

COURSE OBJECTIVES:
- *To express the students to the concept of good requirements of good estimators and its relations with different theorems and inequalities.*
- *To express the students to the concept of estimation of Parameters and its practical utility in real life problems.*

COURSE LEARNING OUTCOMES:
After completing this course, students must be able:
- *To understand the concept of good estimators and their applications in practical world.*
- *To understand the concept of estimation techniques and their applicability in real data sets.*

THEORY: 04 CREDITS

UNIT I
Statistical Inference: Parameter, Parameter space, Statistic and its sampling distribution. Types of Estimation (Point and Interval estimation), Confidence Interval. Estimate and estimator. Requirements of a good estimator with examples. Unbiasedness, consistency, efficiency and sufficiency.

UNIT-II
Methods of Estimation: Maximum likelihood Estimation (MLE), method of moments, method of minimum chi-square, method of minimum variances and method of least square properties and applications. Examples on MLE and method of moments.

UNIT- III
Complete statistic, Minimum variance unbiased estimator (MVUE), Factorization theorem (statement and applications) with examples. Rao-Blackwell statement and applications, Cramer-Rao inequality statement and applications.

UNIT IV
Test of significance: Null and alternative hypotheses (simple and composite), review of Type-I and Type-II errors with examples, critical region, level of significance, size and power, best critical region, most powerful test, uniformly most powerful test, Neyman Pearson Lemma (statement and applications to construct most powerful test).

PRACTICAL: 02 CREDITS   USING STATISTICAL / COMPUTATIONAL SOFTWARE'S
PROBLEMS BASED ON:

I.   Unbiased estimators, Consistent estimators, efficient estimators and relative efficiency of estimators.
II. Sufficient Estimators, Complete Sufficient estimators
III. Maximum Likelihood Estimation.
IV. Estimation by the method of moments.

BOOKS RECOMMENDED:
1. Goon A.M., Gupta M.K.: Das Gupta. B.: Fundamentals of Statistics, Vol. I,World Press, Calcutta, (2005).
2. Rohatgi V. K. and Saleh, A.K. Md. E.: An Introduction to Probability andStatistics. 2nd Edn. (Reprint) John Wiley and Sons, (2009).
3. Miller, I. and Miller, M.: John E. Freund's Mathematical Statistics (6thaddition, low price edition), Prentice Hall of India, (2002).
4. Dudewicz, E. J., and Mishra, S. N: Modern Mathematical Statistics. JohnWiley & Sons, (1988).
5. Bhat B.R, Srivenkatramana T and Rao Madhava K. S.: Statistics: A Beginner's Text, Vol. I, New Age International (P) Ltd, (1997).
6. Snedecor G.W and Cochran W.G: Statistical Methods. Iowa State UniversityPress, (1967).