



**MANGALORE UNIVERSITY**  
**Department of Statistics**

**STH453:THEORY OF POINT ESTIMATION**

**Hours/Week:4**  
**Credits : 4**

**I.A.Marks:30**  
**Exam.Marks:70**

**Course Outcome**

**CO1: To apply various estimation and testing procedures to deal with real life problems.**

**CO2: To understand Fisher Information, Lower bounds to variance of estimators, MVUE and apply them in practical situations.**

**CO3: To understand consistency, sufficiency, unbiasedness, CAN and BAN estimators**

**UNIT-I**

10 Hrs.

Parametric models, likelihood function; examples from standard discrete and continuous models. Information in data. About the parameters as variation in likelihood function, concept of no information, sufficiency, Neyman factorizability criterion, likelihood equivalence. Fisher information for single and several parameters.

**UNIT-II**

10 Hrs.

Minimal sufficient statistic, Exponential families and Pitman families. Minimum Variance Unbiased Estimation, unbiasedness, locally unbiased estimators, minimum variance, locally minimum variance, mean squared error, Cramer-Rao lower bound approach.

**UNIT-III**

08 Hrs.

Minimum variance unbiased estimators (MVUE), Rao-Blackwell theorem, completeness, Lehman-Scheffe theorem, necessary and sufficient condition for MVUE.

**UNIT-IV**

10 Hrs.

Consistent estimation of real and vector valued parameter, invariance of consistent estimator under continuous transformation: Consistency of estimators by method of moments and method of percentiles, mean squared error criterion, Asymptotic relative efficiency. Consistent asymptotic normal (CAN) estimator.

**UNIT-V**

10 Hrs.

Method of Maximum Likelihood: notion, MLE in exponential family, Cramer Family, Multinomial with all probabilities depending on a parameter, solutions to likelihood equations, method of scoring, Newton-Raphson and other iterative procedures. Fisher lower bound to asymptotic variance, extension to multiparameter case (without proof).

**REFERENCE BOOKS:**

1. Casella G. and Berge R.L. (2002): Statistical Inference, 2<sup>nd</sup>Ed., Thomson- Duxbury, Singapore.
2. Kale B.K. and Muralidharan( 2015): Parametric Inference, An Introduction, Alpha Science International Limited.
3. Kendall M.G. and Stuart A. (1968): The Advanced Theory of Statistics, Vol.II, Charles Griffin and Co.
4. Lehman E.L. (1986): Theory of Point Estimation, John Wiley.
5. Rao C.R. (1973): Linear Statistical Inference and Its Applications. Wiley Eastern.
6. Rohatgi V.K. and A.K.L. Salah (2001): An Introduction to Probability and Mathematical Statistics. Wiley Eastern.
7. Silvey S.D. (1970): Statistical Inference. Chapman and Hall.
8. Zacks S. (1981): Parametric Statistical Inference, Pergamon Press

