ST2 C08: STATISTICAL ESTIMATION THEORY

UNIT I

Criteria for estimators - unbiasedness, consistency and efficiency, minimum variance, Fisher information, Cramer – Rao inequality, Bhattacharyya's bounds.

UNIT II

Sufficiency, completeness, bounded completeness, Fisher-Neymann factorization theorem, minimal sufficiency, exponential families, Rao- Black well theorem, Lehmann – Scheffe theorem, ancillary statistics, Basu's theorem.

UNIT III

Methods of estimation: method of moments, method of maximum likelihood & their properties, Fisher's scoring method, method of minimum chi-square and method of modified minimum chi-square, confidence intervals, shortest confidence intervals.

UNIT IV

Elements of decision theory, statistical decision problem, loss and risk functions, decision rule, estimation and testing as particular cases, prior and posterior distributions, Bayes estimator, admissible decision rules, non-randomized and randomized decision rules, bootstrap and Jackknife techniques (basic concepts only).

Reference Books:

1. Lehmann E.L. (1983) Theory of point estimation – Wiley, New York.
2. Rohatgi V.K. (1988) An introduction to probability theory and mathematical statistics, Wiley Eastern.
3. Hogg R. V. and Craig A. T. (1989) Introduction to Mathematical Statistics, Macmillan Publishing Company.
4. Kale B. K. (1999) A First Course on Parametric Inference, Narosa Publishing House.
5. Lindgren B.W (1976) Statistical Decision Theory (3^{rd} Edition), Collier Macmillian, New York.
6. Rao C.R (1974) Linear Statistical Inference and its Applications, John Wiley, New York.