

STAT-802 Statistical Inference (3 Credit Hours)

1. Objectives

This course aims to introduce students to the different statistical hypothesis testing procedures and methods.

2. Course Contents

The uniformly minimum variance unbiased estimator and U-statistics The least-square estimation (LSE) in Linear Models. Asymptotically unbiased estimators, functions of unbiased estimators, the method of moments, V-statistics and weighted LSE. Bayes decisions and estimators, invariance, minimalism and admissibility. The method of maximum likelihood. Distribution estimators and linear functions of order statistics, sample quantiles, robustness and efficiency. L-estimators in the linear model. Generalized estimating equations. The substitution method, jackknife and bootstrap. Uniformly most powerful (UMP) test. Tests in parametric and nonparametric models. Construction of confidence sets.

3. Recommended Books

- i. Jun S. Mathematical Statistics, 2nd Edition. Springer (2003).
- ii. Garthwaite, P. H., Jolliffe, I.T. and Jones, B., Statistical Inference, 2nd Edition. Oxford University Press (2002).
- iii. Hogg, R., Tanis, E. A. and Robert V. H., Probability and Statistical Inference. Prentice Hall (2000).
- iv. Mood, A.M. Graybill, F.A. and Boss, D.C., Introduction to the Theory of Statistics. McGraw Hill, New York (1997).
- v. Casella, G. and Berger, R.L., Statistical Inference, Duxbury Thomson Learning (2002).
- vi. Verlag. Cox, D.R. Principles of Statistical Inference Cambridge University (2006).

4. Outcomes

On successful completion of this course, students will be able to conduct the hypothesis testing, construct the estimators, through LSE, mle and generalized estimation procedure, learn the substitution methods, and construct the confidence interval.