STAT-809 Survival Data Analysis (3 Credit Hours)

1.Objectives

This course aims to introduce students to the survival data, related methods for estimation and modeling.

2. Course Contents

Multiparameter analysis using large sample likelihood methods for response time data, survival function and hazard function, multiparameter models, reparameterization and regression-type models, likelihood functions for censored data, Kaplan Meier estimation, testing based on maximum likelihood estimators, likelihood ratios and score tests. Computational methods including the EM. Algorithm, partial likelihood methods for proportional hazards, analysis of grouped data. Censoring and truncation, non-parametric estimation of hazard and survival functions. log-rank test and other non-parametric tests, parametric survival models, Cox's proportional hazards model, nested case-control and case-cohort studies, frailty models and marginal models. Related applications/computations with R.

3. Recommended Books

i. Bain, L.J., Statistical Analysis of Reliability and Life-Teasting Models, Marcel Dekker (1991).
ii. Lawless, J.F., Statistical Models and Methods for Lifetime Data, John Wiley and Sons (2011).
iii. Smith, P.J., Analysis of Failure and Survival Data. CRC Press. (2002).
iv. Miller, Jr. R.J., Survival Analysis. John Wiley and Sons. (2011).

4. Outcomes

On successful completion of this course, students will be able to analyze and model the survival data. Moreover learning outcomes include the grouped data, censoring, parametric and nonparametric estimation/models for case-control and cohort studies.