University of Sri Jayewardenepura

Department of Statistics

STA 211 2.0 Sampling Techniques

Type : Core

Duration: 30 lecture hours

Pre-requisites:

- STA 111 2.0 Elements of Sampling and Descriptive Statistics
- STA 112 3.0 Probability and Distribution Theory
- STA 121 3.0 Statistical Inference
- STA 122 2.0 Data Analysis I

Objectives:

- To introduce theories and techniques of sampling
- To apply those theories and techniques appropriately to plan and organize sample surveys
- To estimate parameters and their standard errors in the real life problems.

Course contents:

1. Introduction:
   Why sampling surveys are used?, Terminology, Steps in a sample survey, Probability vs. Non-probability Sampling, Probability sampling methods, Non-Probability sampling methods, Notations.

2. Simple Random Sampling:
   Selection of a simple random sample, Definitions and notations, Point and interval estimates of population mean, Population total and proportion, Properties of estimators, Determination of sample sizes.

3. Stratified random sampling:
   Selection of a stratified random sample, Estimation of population mean, Determination of sample size for estimating population mean with a given standard error, Equal allocation, Proportion allocation, Neymann allocation, Optimum allocation.

4. Sampling with probability proportional to size(PPS):
   Selection of a PPS sample, Estimation of population Total and standard error of the estimator.

5. Ratio estimation:

   Ratio estimation using simple random samples, Ratio estimation using stratified random samples

6. Cluster sampling:
   Selection of a cluster sample, Estimation of population mean and total, Cluster sampling with equal sizes.

7. Systematic sampling:
   Selection of a systematic sample, Estimation

Learning Outcomes: At the end of the course, you will be able to:

- Compare the random and non-random sampling methods.
- Explain the real life situations where different sampling methods are applied.
- Compare advantages and disadvantages of different sampling methods.
- Identify population and its parameters to be estimated for given real life problems.
- Apply an appropriate sampling techniques to draw a sample from a population.
- Estimate parameters and their standard errors under different sampling methods.
- Calculate and interpret the confidence intervals for parameters under different sampling methods.
- Determine the sample sizes for estimating a given population parameter (mean, total, proportion) for a given standard error.
- Draw a PPS sample from a given population.
- Estimate the ratios of parameters using simple random sampling and stratified random sampling.
- Derive unbiased estimator for population parameters under different sampling methods.

Method of Assessment:

1. Mid Semester Examination - 20%
2. End of Semester Examination - 80%

Note: At least 80% attendance for lectures is required to sit for end semester examination

Reference Text books:

- Sampling Techniques – Cochran W. G
- Elementary Survey Sampling – R. L. Scheaffer, W. Mendenhall, Lyman Ott
- Sampling – Steven K. Thompson

Lecturer in charge: Ms. Thiyanga Talagala