

ST3 C11: SAMPLING THEORY

UNIT I

Census and sampling methods, probability sampling and non-probability sampling, principal steps in sample surveys, sampling errors and non-sampling errors, bias, variance and mean square error of an estimator, simple random sampling with and without replacement, estimation of the population mean, total and proportions, properties of the estimators, variance and standard error of the estimators, confidence intervals, determination of the sample size.

UNIT II

Stratified random sampling, estimation of the population mean, total and proportion, properties of estimators, various methods of allocation of a sample, comparison of the precisions of estimators under proportional allocation, optimum allocation and srs. Systematic sampling – Linear and Circular, estimation of the mean and its variance. comparison of systematic sampling, srs and stratified random sampling for a population with a linear trend.

UNIT III

Ratio method of estimation, estimation of the population ratio, mean and total, first order approximate expression for bias, mse of ratio estimates, comparison with srs estimation. Unbiased ratio type estimators- Hartly- Ross estimator, regression method of estimation, first order approximate expression for bias and mse of linear regression estimators, large sample comparison with mean per unit estimator and ratio estimators, Cluster sampling, single stage cluster sampling with equal and unequal cluster sizes, estimation of the population mean and its standard error. Two- stage cluster sampling with equal and unequal cluster sizes, estimation of the population mean and its standard error.

UNIT IV

Unequal probability sampling, PPS sampling with and without replacement, cumulative total method, Lahiris method, Midzuno-Zen method, estimation of the population total and its estimated variance under PPS wr sampling, ordered and unordered estimators of the population total under PPS wor, Horwitz – Thomson estimator and its estimated S. E, Des-Raj's ordered estimator, Murthy's unordered estimator (properties of these estimators for $n=2$ only)

Text Books:

1. Cochran W. G. (1999) Sampling Techniques, 3rd edition, John Wiley and Sons.
2. Mukhopadyay P. (2009) Theory and Methods of Survey Sampling, 2nd edition, PHL, New Delhi.

Reference Books:

1. Singh D. and Choudhary F. S. (1986) Theory and Analysis of Sample Survey Designs, Wiley Eastern Ltd.
2. Des Raj (1967) Sampling Theory, Tata McGraw Hill, New Delhi.
3. Sampath S. C. (2001) Sampling Theory and Methods, Alpha Science International Ltd., India.