

Module Code:	STAT-312 STAT-313
Module Title:	<ul style="list-style-type: none"> • Advanced Sampling Techniques (Theory) – 3 Credit Hours • Practical – 1 Credit Hour
Name of Scheme:	BS Statistics

Course Outline

1. Ratio and Regression estimation. Estimation of total, mean square error and bias using design based approach and model based approach in estimate in simple random sampling. Unbiased ratio-type estimators. Ratio estimation in stratified sampling. Estimation of mean and variance in linear regression estimates. Best linear unbiased estimator (BLUE). Bias of the linear regression estimates. Regression estimation in stratified sampling. The Linear regression estimator under the general linear model.
2. Cluster sampling. Estimation of mean, total and variance for single-stage cluster sampling. Cost function. Variance function, cluster sampling for proportions, Sampling with unequal probability with replacement.
3. Two-stage sampling. Estimation of mean, total, proportion and variance. Both stages with equal probability. Two-stage sampling with units of unequal sizes, First stage PPS (with replacement) and second stage with equal probability. Both stages with probability proportional to size and with replacement. Sampling methods when a single primary unit is selected for the sample. Basic concept of double sampling.

Books Recommended

1. Cochran, W.G. "Sampling Techniques" John Wiley & Sons, New York, Third Edition, 1977.
2. Raj, D., "Sampling Theory" Mc-Graw-Hill Book Company, New York, 1971.
3. Singh, D. Chaudhry F.S. "Theory and Analysis of Sample Survey Designs", Wiley Eastern Limited, New Dehli, India, 1986.

Reference Books

1. Fuller, Wayne A. "Sampling Statistics" John Wiley and Sons, New Jersey, 2009.
2. Brewer, K. "Combined Survey Sampling Inference" Oxford University Press, New York, 2002.
3. Raj, D. "Design of Sample Survey" Mc-Graw-Hill Book Company, New York, 1971.
4. Kish, L. "Survey Sampling" John Wiley and Sons, New York, 1965.
5. Som, R.K. "A Manual of Sampling Techniques" Heinemaan Educational Books Limited, London, 1973.
6. Sukhatme, P.V. and Sukhatme, B.V., Sukhatme, S. and Asok, C. "Sampling Theory of Surveys with Applications" Iowa State University Press, Ames, IOWA. Third Edition, 1984.