SMS 3105: DESIGN AND ANALYSIS OF SAMPLE SURVEYS Lecture hours: **45 hours**

PRE-REQUISITES: SMS 3100

CO-REQUISITE: NONE

1. Purpose

To enable the students to apply the principles of survey sampling and to understand the different methods used in sampling.

2. Objectives

At the end of the course the student should be able to

a) Define a sample survey and identify the advantages and principal steps in organizing a survey.
b) Explain the probability and purposive types of samples.
c) Apply simple random sampling both in proportions and percentages.
d) Explain the principles of estimating sample size.
e) Explain the methods of random sampling such as stratified, systematic, cluster, multistage and proportional.
f) Determine the ratio and regression estimators.
g) Distinguish between sampling and non-sampling errors.
h) Explain how national surveys are conducted, and the work done by the Kenya National Bureau of Statistics.

3. Course Description

a) Commonly used sample survey designs: random, systematic stratified, cluster and multistage sampling.
b) Model based inference: properties of ratio, regression, Horvitz – Thompson and combined ratio estimators.
c) Variance estimation techniques: linearization, and re - sampling techniques such as jack knife, BRR (balanced repeated replication), and bootstrap.
d) Bias-robust methods: nonparametric regression for finite population total and estimator of its variance, and potential unexploited extensions such as neural network and spline regression, post-stratification, two phase sampling and repeated surveys.
e) Data collection methods. Interviewing techniques. Questionnaire design, attitude scaling, non- sampling errors.
f) Non-response types: item, non-coverage and unit non-responses.
g) Estimator of population mean under fixed population model and its properties.

h) Imputation: random, deductive, mean value, hot deck and NN (nearest neighbour).

i) Small area estimation. Model assisted surveys. Software tools to help in survey design

4. Learning and Teaching Methodologies:

Students attain knowledge through lectures, seminars, tutorials, and independent studies. Lectures are tutor-led but with an emphasis on student discussion and seminar paper presentation.

5. Instructional Materials and Equipment

Chalk/white board, Power-point projector, LCD Projector, Transparencies, films, slides and computer.

Assessment:

Examination	70%
Continuous Assessment	30%
Total	100%

6. Course Text Books

a) Yates, F.1981. *Sampling Methods for Censuses and Surveys.* 4th ed.New York.

b) Cochran, W.G. 1977. *Sampling Techniques*.3rd ed .New York: Wiley.

7. Course Journals:

a) Statistics Surveys

b) Survey Methodology

8. Reference Textbooks

a) Deming, W.E. 1950. *Some Theory of Sampling. New* York: Dover ISBN-13: 9780486646848 ISBN: 048664684X.

b) Lohr Sharon (1999). *Sampling: Design and Analysis.* Duxbury press ISBN 10 :0-534- 35361-4.

c) B. Agarwal, *Basic Statistics*, Wiley Eastern, 1995

9. **Reference Journals**

a) Annals of Statistics

b) Journal of the American Statistical Association

c) Biometrics