STA 2303/STA 2402 Design and Analysis of Sample Surveys (45 Contact Hours)

Pre-requisite: STA 2201 Probability and Statistics III

1. Course purpose

This course unit is designed with the intention to enable students apply principles of survey sampling and to understand and apply the different methods used in sampling.

2. Learning outcomes

By the end of this course the student should be able to:

1. Define a sample survey and identify the advantages and principal steps in organizing a survey.
2. Describe the probability and purposive types of samples.
3. Apply simple random sampling both in proportions and percentages.
4. Describe the principles of estimating sample size.
5. Discuss the methods of random sampling such as stratified, systematic, cluster, multistage and proportional.
6. Determine the ratio and regression estimators.
7. Distinguish between sampling and non-sampling errors.
8. Outline how national surveys are conducted, and the work done by the Kenya National Bureau of Statistics.

3. Course description

Sample survey: definition, advantages and principal steps in organizing a survey. Types of samples: probability and purposive. Simple random sampling: sampling proportions and percentages; estimating sample size; stratified random, systematic, cluster and multistage samples; selections with p.p.s (probability proportional to size). Ratio and regression estimators, sampling and non-sampling errors, organisation of national surveys, and the Kenya National Bureau of Statistics. Use of computer packages.

4. Course outline

Week	Content	Method
1	Fundamentals: Sample survey: definition, advantages, and principal steps in organizing a survey. Types of samples: probability and purposive.	Theory
2	Simple random sampling	Theory and practical
3	Sampling proportions and percentages; estimating sample size	Theory and practical
4	Stratified random sampling	Theory and practical
5	**Cat 1**	
6	Systematic random sampling	Theory and practical
7	Cluster random sampling	Theory and practical
8	Ratio and regression estimation	Theory and practical
9	Two-phase sampling (double sampling)	Theory and practical
10	Varying probability sampling	Theory and practical
11	Two stage sampling	Theory and practical
11	Sampling and non-sampling errors, organization of national surveys, and the Kenya National Bureau of Statistics.	Theory and practical
12	**Cat 2**	

5. Teaching and Learning Methodology

Lectures, tutorials, class discussions.

6. Instructional Materials/Equipment

Whiteboards/smart boards, whiteboard markers, duster, computers and projector, and hand-outs.

7. Course Assessment Procedures

(i) Continuous Assessment Tests (25%)
(ii) Assignments (5%)
(iii) End-of-Semester Examination (70%)

8. Course Textbooks

(i) McFarlane A. M. & Graybill F. A. (1974), Introduction to the Theory of Statistics, McGraw-Hill, ISBN-10: 0070854653.
(ii) Cochran W. G. (1977), Sampling Techniques, 3rd ed., John Wiley and Sons, ISBN-10: 047116240X.
(iii) Leslie K. (1995), Survey Sampling, John Wiley, ISBN-10: 0471109495.

9. Reference Textbooks

(i) Lohr S. (1999), Sampling: Design and Analysis, Duxbury Press, ISBN: 0-534-35361-4.
(ii) Deming W. E. (1950), Some Theory of Sampling, Dover, ISBN-13: 9780486646848.

10. Course Journals

(i) Statistics Surveys, ISSN: 1935-7516.
(ii) Survey Methodology, ISSN: 0714-0045.
(iii) Journal of Biometrics, ISSN: 2229-6689 (print), ISSN: 2229-6697 (electronic).

11. Reference Journals

(i) Annals of Statistics, ISSN: 0090-5364.
(ii) Journal of the American Statistical Association, ISSN: 0162-1459.
(iii) Biometrics, ISSN: 0006-341X.
(iv) Annals of Mathematical Statistics, Institute of Mathematical Statistics, ISSN: 0003-4851.