Hong Kong Baptist University
Faculty of Science
Department of Mathematics

Title (Units): STAT 2710 DESIGN AND ANALYSIS OF SURVEYS (3,3,0)

Course Aims: To provide students with a good understanding of survey operations, survey sampling methods and the corresponding analyses of data. Important points in questionnaire design will also be addressed in the course. Students will form teams to do course projects. On completion of the course, students should be able to design, carryout, and write reports based on a professional survey.

Prerequisite: STAT 1131 Statistical Methods & Theory I or STAT1620 Computer-Aided Statistics

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Learning Outcomes (LOs)

Upon successful completion of this course, students should be:

No.	Learning Outcomes (LOs)
	Knowledge
1	Able to understand the process of surveys
2	Able to understand the mathematical theory of various sampling techniques
3	Able to understand the questionnaire design method and interview methods
4	Able to understand the methods of data analyses when missing data and non-responses are needed to deal with
	Skills
5	Able to design questionnaires
6	Able to use the learnt methods to deal with missing data and non-responses
7	Able to use various sampling methods to deal with different survey problems
	Attitudes
8	Able to work effectively in a team
9	Able to do data analyses independently

Assessment:

No.	Assessment Methods	Weighting	Remarks
1	Continuous Assessment (assignments, and mini-project)	35%	Assignments are designed to measure students understanding of the interview methods and questionnaire design, and their understanding of sampling methods. The mini-project is designed to see if students can work effectively in a team and to see what they need to improve.
2	Final Examination	65%	Final Examination is designed to see how far students have achieved their intended learning outcomes especially in the Knowledge domain. Students should have a thorough understanding of the knowledge and apply them correctly in different context to do well in the exam.

Learning Outcomes and Weighting:

Content	LO No.	Teaching (in hours)
I. Overview of the Survey Process	1, 3-6, 8-9	14
II. Simple Random Sampling	2, 7	4
III. Stratified Random Sampling	2, 7	4
IV. Further Estimation Methods	2, 7	6
V. Systematic Sampling	2, 7	4
VI. Cluster Sampling	2, 7	8

Textbook(optional): R.L. Scheaffer, W. Mendenhall III and L. Ott, Elementary Survey Sampling, Duxbury Press, 5th Ed., 1996.

References: W.G. Cochran, Sampling Techniques, Wiley, 3rd Ed., 1997.
L. Kish, Survey Sampling, Wiley 1965.
Y.K. Chan, F.W.H. Ho, K.W. Ng and S.M. Shen, A Practical Guide to Sample Surveys, Hong Kong Statistical Society, 1991 (English Edition) and 1992 (Chinese Edition).

Software: SAS or SPSS or MATLAB

Course Content in Outline:

Topic	Hours
I. Overview of the Survey Process	14
A. Overall planning of a survey operation	
B. Design and selection of samples	
C. Design of questionnaires	
D. Collection of data	
E. Non-sampling errors	
F. Random-response model	
II. Simple Random Sampling	4
A. How to draw a simple random sample	
B. Estimation of a population mean and total	
C. Estimation of a population proportion	
III. Stratified Random Sampling	4
A. How to draw a simple random sample	
B. Estimation of a population mean and total	
C. Allocation of the sample	
D. Estimation of a population proportion	
E. Optimal rules for choosing strata	
IV. Further Estimation Methods	6
A. Ratio estimators	
B. Regression estimation	
C. Difference estimation	
D. Relative efficiency of estimators	
V. Systematic Sampling	4
A. How to draw a simple random sample	
B. Estimation of a population mean and total	
C. Estimation of a population proportion	
D. Repeated systematic sampling	
VI. Cluster Sampling	8
A. One-stage and two-stage cluster samples	
B. How to draw a cluster sample	
C. Estimation of a population mean and total	
D. Estimation of a population proportion	
E. Cluster sampling combined with stratification	
F. Two-stage cluster sampling with probabilities proportional to size	