

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT 565: Sampling Methods - Term 141 (3-0-3)

Course Objectives:

Simple random sample. Sampling proportion. Sample size estimation. Stratified random sampling. Ratio, regression, and difference estimators. Systematic sampling. Single stage cluster sampling. Multi-stage cluster sampling. Unequal probability sampling.

Prerequisites: Graduate Standing.

Textbook

Ravindra Singh and Naurang Singh Mangat (1996). Elements of Survey Sampling. Series ISSN: 0927-4529, Springer Netherlands.

Package:

1. R statistical language

Instructor: Dr. Nasir Abbas

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Assessment

Assessment for this course will be based on homework, term report, 2 major exams and a comprehensive final exam, as in the following:

Activity	Weight
Homework, Quizzes, Attendance and Class participation	10%
Exam 1	20%
Exam 2	20%
Term Paper Report	15%
Final Exam (Comprehensive)	35%

Tentative syllabus

The main objective of the course is to provide a deeper understanding of theory and applications of Sampling Methods. The course will help graduate students in learning advance techniques of analyzing the data after survey and sampling procedures.

Topics:

- Introduction to sampling
 - Population and Sample
 - Sampling Frame
 - Statistic and Parameter
 - Probability and Non-probability Sampling
 - Sampling and Non-sampling Errors
 - Relative Standard Error (RSE)
 - Bias and Mean Square Error (MSE)
 - Standard Deviation and Standard Error
 - Probability Distribution and Sampling Distribution
- Simple Random Sampling (SRS)
 - With and Without Replacement Sampling
 - Point Estimation of Population Mean and Population Total
 - Interval Estimation of Population Mean and Population Total
 - Sample size determination
 - Point and Interval estimation of Population Proportion
- Use of Auxiliary Information in Simple Random Sampling
 - Ratio, Product, Difference and Regression Estimators
 - Power Transformation Estimator
 - Dual Ratio Estimator
 - Methods of removing Bias from Ratio and product estimators
- Probability Proportional to Size (PPS) sampling
 - Cumulative Total Method
 - Lahiri's Method
 - Estimation of Population Total and Population Mean
- Stratified Random Sampling
 - Methods of Allocation
 - Equal Allocation
 - Proportional Allocation
 - Neyman Allocation
 - Optimum Allocation
 - Use of Auxiliary Information
 - Separate ratio estimator
 - Separate regression estimator
 - Combined ratio estimator
 - Combined regression estimator
- Systematic Sampling

- Linear Systematic Sampling
- Circular Systematic Sampling
- Estimating mean/total
- Cluster Sampling
 - Estimation of mean
 - Estimation of total
 - Relative efficiency of cluster sampling
 - Determining the sample size for estimating mean/total
 - Estimation of proportion
 - Multi-stage Cluster Sampling