

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
COLLEGE OF COMPUTING AND MATHEMATICS
MATHEMATICS DEPARTMENT
STAT 565 Sampling Methods – T252

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Course Description (3-0-3):

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.

Course Objectives 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.

Textbook: Lohr S. L. (2010), Sampling: Design and Analysis. Cengage Learning.

Additional Reference: *Sampling Techniques*, by William G. Cochran. Third edition, John Wiley & Sons, Inc. 1977

Software: R language and Python.

Learning Outcomes After the completion of this course, students should be able to:

1. Learn a variety of common sampling designs.
2. Apply sampling theory to sample survey problems.
3. Understand elements of proper survey design.

Assessment

Activities	Weight
Class Activities (Quizzes and participation)	15%
Mid-Term	30%
Final exam (comprehensive)	40%
Project	15%

Grades: The letter grades will be assigned based on relative performance of the registered students.

Project Description

The project should be based on a real problem (with complete description) and a detailed analysis using the skills developed in the course. There should be some concluding remarks that refer to the real implications of your chosen problem, preferably in your major area. You may use online sources in your project with proper citation/reference. A final project presentation in class is required before the end of the semester.

Week	Topics
Week 1 Jan. 11-15	Introduction
Week 2 Jan. 18-22	Simple Probability Samples
Week 3 Jan. 25-29	Simple Probability Samples
Week 4 Feb. 01-05	Simple Probability Samples - Stratified Sampling
Week 5 Feb.08-12	Stratified Sampling
Week 6 Feb.15-19	Ratio and Regression Estimation
Week 7 Feb. 23-26	Ratio and Regression Estimation
Week 8 Mar.01-05	Ratio and Regression Estimation - Cluster Sampling with Equal Probabilities
Week 9 Mar. 08-12	Cluster Sampling with Equal Probabilities
Week 10 Mar. 29- Apr. 02	Cluster Sampling with Equal Probabilities - Sampling with Unequal Probabilities
Week 11 Apr. 05- 09	Sampling with Unequal Probabilities
Week 12 Apr.12-16	Complex Surveys
Week 13 Apr. 19-23	Complex Surveys - Nonresponse
Week 14 Apr.26- 30	Nonresponse - Project Presentations
Week 15 May. 03-07	Project Presentations
Week 16 May 10	Review

Cheating in Exams: Cheating or any attempt at cheating by use of illegal activities, techniques and forms of fraud will result in a grade of DN in the course along with reporting the incident to the higher university administration for further action. Cheating in exams includes (but is not restricted to):

- Looking at the papers of other students.
- Talking to other students.
- Using mobiles, smart watches or any other electronic devices.
- Using ChatGPT or any AI source.

Missing an Exam: In case a student misses an exam for a legitimate reason (such as medical emergencies), he/she must bring an official excuse from Students Affairs. Otherwise, he/she will get a score of zero in the missed exam.

Attendance: Students are expected to attend all lectures and labs.

- If a student misses a class/lab, he/she is responsible for any announcement made in that class/lab.
- After being warned **twice** by the instructor, a DN grade will be awarded to any student who accumulates 9 unexcused absences.