King Fahd University of Petroleum and Minerals
Department of Mathematics
STAT 502 Syllabus, Term 251 (2025-26)
Instructor: Dr. Nasir Abbas (nasirabbas@kfupm.edu.sa)

Course Title: Statistical Inference

Course Credit Hours: 3-0-3

Textbook: Introduction to Mathematical Statistics by RV Hogg, JW McKean and AT Craig, 8th edition, Pearson 2018.

Software Package: R language and R studio.

Course Objective: To master the basics of estimation theory with an aim to apply the popular probability models to samples for statistical inference.

Course Description: Methods of estimation. Properties of estimators: consistency, sufficiency, completeness and uniqueness. Unbiased estimation. The method of moments. Maximum likelihood estimation. Techniques for constructing unbiased estimators and minimum variance unbiased estimators. Bayes estimators. Asymptotic property of estimators. Introduction to confidence intervals. Confidence intervals for parameters of normal distribution. Methods of finding confidence intervals. Fundamental notions of hypotheses testing. The Neyman-Pearson lemma. Most powerful test. Likelihood ratio test. Uniformly most powerful tests. Tests of hypotheses for parameters of normal distribution. Chisquare tests, t-tests, and F-tests.

Course Learning Outcomes: Upon successful completion of the course, a student should be able to

- explain properties of estimators,
- describe the methods of methods of finding confidence intervals,
- discuss the fundamental notions of hypotheses testing,
- use statistical packages to simulate the probability models.

Grading Policy:

Activity	**Weight**
Classwork (assignments, attendance, presentations, bonuses, etc.)	15%
Quizzes	15%
Midterm Exam	30%
Final Exam (Comprehensive)	40%

Coverage Plan

Chapter No.	Chapter Name	No. of Weeks
4	Some Elementary Statistical Inferences	4
5	Consistency and Limiting Distributions	2
6	Maximum Likelihood Methods	3
7	Sufficiency	2
8	Optimal Tests of Hypotheses	4

Academic Integrity: All KFUPM policies regarding ethics and academic honesty apply to this course.

Excuse: In case a student misses an exam (Midterm or Final) 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.

Cheating and Plagiarism: 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.

Mobiles: The use of mobiles is *strictly banned* during class. Students are required to keep their phones off/silent and placed inside their pockets during the class timings.

Project: Project Guidelines will be uploaded to Blackboard, and guidelines for the report will also be posted there. The instructor will form project groups.

Letter Grades: The letter grades will follow a grading curve, which depends on the average of all students enrolled in the course.

Attendance Notes:

Students are expected to attend all lectures.

- If a student misses a class, he/she is responsible for any announcement made in that class.
- After being warned twice by the instructor, a DN grade will be awarded to any student who accumulates
  - 6 unexcused absences (20%), or,
  - 10 excused and unexcused absences (33%)

Use of AI Tools (like ChatGPT):

- Students are encouraged to use AI responsibly as a learning aid for understanding lecture content, practicing statistical concepts, and preparing for exams.
- However, the use of AI during quizzes and exams is *strictly prohibited* and will be treated as an academic integrity violation.