

King Fahd University of Petroleum and Minerals Dhahran, Saudi Arabia
Department of Mathematics
STAT-502: Statistical Inference (Term 212)

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Course Objectives: 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.

Textbook: *An Introduction to Probability and Statistics* by VK Rohatgi and AK Saleh, 3rd Edition, Wiley Series in Probability and Statistics, 2015.

Course Assessment

Activity	Weight
Class Participation (home works, quizzes, attendance, project etc.)	15%
First Major Exam	25%
Second Major Exam	25%
Final Exam (Comprehensive)	35%

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

Schedule

Chapter No.	Chapter Name	Topics	No. of Weeks
8	Parametric Point Estimation	Point Estimation, Unbiasedness, Consistency, Sufficiency, Efficiency, Method of Moments, Method of Maximum Likelihood, Bayes' Estimation	5
9	Neyman-Pearson Theory of Hypothesis Testing	Fundamentals of Hypothesis Testing, Neyman-Pearson Lemma, Most Powerful Test	3.5
10	Some Further Results on Hypothesis Testing	Generalized Likelihood Ratio Test, Chi-square Tests, T tests, F Tests	3.5
11	Confidence Estimation	Fundamentals of Interval Estimation, Methods of Finding Confidence Interval, Unbiased Confidence Intervals	3