

**KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS**  
**Department of Mathematics and Statistics**  
**Dhahran, Saudi Arabia**

**STAT502: STATISTICAL INFERENCE**  
 TERM 142: (MON, 26 JAN, 2015 TO THU, 14 MAY, 2015)

**Course Objectives:**

To present a mathematical foundation of statistical principles, its relevance and importance in sampling with a view to make decisions in the real world problems that can be modeled by probability functions.

Textbook: Rohatgi, V.K. and Saleh, A.K. (2001). An Introduction to Probability and Statistics. John Wiley and Sons, Inc.

Instructor: Nasir Abbas

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Office Hours: 12:10-1:10 PM on Sunday, Tuesday and Thursday and 2:00-3:30 pm on Sunday, or by appointment.

Lecture Room: 4-106

**Assessment:** Assessment for this course will be based 3 in-course exams and a comprehensive final exam, as in the following:

Activity	Weight
Exam 1 (Point Estimation)	20%
Exam 2 (Interval Estimation)	20%
Exam 3 (Tests of Hypotheses)	20%
Final Exam (Comprehensive), 0700 pm to 1000 pm, Thursday, 2014	40%

**Syllabus**

W1: Sufficiency, Completeness and Ancillarity (Chapter 8.1-8.3)

W2: Unbiased Estimation (Chapter 8.4)

W3: Bound for the Variance of an Estimator (8.5)

W4: Method of Moments and Likelihood (Chapter 8.6-8.7)

W5: Bayes and Minimax Estimation (Chapter 8.8)

W6: Neyman Pearson Principle of Testing of Hypotheses (Chapter 9.1-9.3)

W7-W8: Optimality in Tests (Chapter 9.4-9.6)

W9: Generalized Likelihood Ratio Test (Chapter 10.1-10.2)

W10-11: Well Known Tests (10.3-10.5)

W12-13: Interval Estimation (Chapter 11)

W14: Bayesian Method of Estimation

**Last Day of Classes: Thursday, 14<sup>th</sup> May, 2014**

**General Notes:**

- Students are required to carry pens, note-taking equipment and a calculator to every lecture and exams. It is strongly recommended to keep a binder for class-notes.
- Students are also expected to take notes and organize their solved questions in a binder for easy retrieval to help them in study and review for class, exams, etc. It is to the student's advantage to keep a binder for storing class notes, homework, and other graded assignments. Students who are organized will find it easier to find important materials when studying for exams.
- To successfully prepare for the exam, students must **solve problems** daily and with discipline. The selected assigned problems are specifically designed to prepare you for major exams and final exam. So, it is expected that you complete these problems **step-by-step** and **with comprehension**.
- Never round your intermediate results to problems when doing your calculations. This will cause you to lose calculation accuracy.
- For every exam, so you need to bring with you *pens, pencils, a sharpener, an eraser, and a calculator*.

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

Catalog 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. Chi-square tests, t-tests, and F-tests.

Prerequisites: STAT 501. Cannot be taken for credit with MATH 561 and MATH 563.