King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

STAT319: Probability and Statistics for Engineers and Scientists
Term 143

Instructor: Muhammad F. Saleh   **Office:** 5-312
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Office Hours: UTR. 10:35 am – 11:55 pm, or by appointment

Course Objectives: Introduce the basic concepts of probability and statistics to engineering students. Emphasis will be given on the understanding of the nature of randomness of real world phenomena; the formulation of statistical methods by using intuitive arguments, solving them and thereby making meaningful decisions.

Learning Outcomes: By completing this course, students should acquire/learn
  ➢ A thorough understanding of descriptive statistics, both graphical and numerical
  ➢ A working knowledge of sample spaces, events, and operations on events
  ➢ Elementary probability concepts
  ➢ A good understanding of random variables and their means and variances
  ➢ Basic discrete and continuous random variables
  ➢ The concept of a sampling distribution, and the central limit theorem
  ➢ Point and interval estimation of means and proportions
  ➢ Basic concepts of hypothesis testing including the hypothesis testing setup, procedure, p-values
  ➢ Correlation
  ➢ Simple linear regression, including estimation and testing of model parameters
  ➢ Basic Concepts of multiple linear regression

Text: Applied Statistics and Probability for Engineers by D. Montgomery and G. Runger, 5th Edition, Wiley, 2011.

Software Package: The Student Edition of *STATISTICA* with a Lab Manual. A Lab syllabus is available with your lab instructor.

Assessment*

Activity	Weight
Class work	10%
Lab Work (see Lab syllabus)	20%
First Major Exam (Chapters 2-4 excluding Sections 4.6&4.7) Date: June 24, 2015 from 10:00pm to 12:00pm, Location Bldg 54	15%
Second Major Exam (Chapters 6(from Lab manual)-9 + Sections 4.6&4.7) Date: July 29, 2015 from 7:00pm to 9:00pm, Location Bldg 54	25%
Final Exam (Comprehensive) Date: August 13, 2015 from 12:30pm to 3:00pm	30%

Grade Assignment

Score	87 – 100	80 – 86	75 – 79	70 – 74	65 – 69	60 – 64	55 – 59	50 – 54
Grade	A+	A	B+	B	C+	C	D+	D

Academic Integrity: All KFUPM policies regarding **ethics** and **academic honesty** apply to this course.
Important Notes:
  ✓ Please bring your book to every class, as well as a calculator with statistical functions.
  ✓ Excessive unexcused absences will result in a grade of ***DN*** in accordance with University rules.
  ✓ ***Attendance*** on time is ***very*** important.

Home Work:
- ✓ To successfully learn statistics, students need to solve problems and analyze data. The selected assigned problems are specifically designed to help you understand the material.
- ✓ Homework is due <u>in class</u> on the first Sunday after completing a chapter.
- ✓ No late homework will be accepted.

Schedule

WEEK	Topics	Reminders
Week 1	**Ch 2: Probability** 2.1 Sample Space and Events 2.2 Axioms of Probability 2.3 Addition Rule 2.4 Conditional Probability 2.5 Multiplication Rule 2.6 Independence 2.7 Bayes' Theorem	
Week 2	**Ch 3: Discrete Probability Distributions** 3.1 Discrete Random variables 3.2 Probability Mass Functions 3.3 Cumulative Distribution Functions 3.4 Mean and Variance 3.5 Discrete Uniform Distribution 3.6 Binomial Distribution 3.7 Geometric Distribution	
Week 3	3.8 Hypergeometric Distribution 3.9 Poisson Distribution **Ch 4: Continuous Probability Distributions** 4.1 Continuous Random Variables 4.2 Probability Density Functions 4.3 Cumulative Distribution Functions 4.4 Mean and Variance	
Week 4	4.5 Continuous Uniform Distribution 4.6 The Normal Distribution 4.7 Normal Approximation to the Binomial and Poisson Distribution 4.8 Exponential Distribution **Ch 7: Sampling Distributions** 7.1 Point Estimation 7.2 Sampling Distributions and the Central Limit Theorem	**MAJOR 1**
	Ch 8: Statistical Intervals for a Single Sample 8.1 Confidence Interval for the Mean of a Normal Distribution with Known Variance 8.2 Confidence Interval for the Mean of a Normal Distribution with Unknown Variance 8.4 Large Sample Confidence Interval for a Population Proportion **Ch 10: Statistical Inference for Two Samples** 10-1.3 Intervals on the Difference in Means of Two Normal Distributions with Known Variances 10-2.3 Intervals on the Difference in Means of Two Normal Distributions with Unknown Variance	

Week 6	10-6.3 Large Sample Intervals on the Difference in Population Proportions
	Ch 9: Tests of Hypotheses for a Single Sample
	  9.1 Hypothesis Testing
	  9.2.1 Tests on the Mean of a Normal Distribution with Known Variance
	  9.3.1 Tests on the Mean of a Normal Distribution with Unknown Variance
	  9.5.1 Tests on a Population Proportion	

Week 7	**Ch 10: Statistical Inference for Two Samples Continued**
	  10-1.1 Tests on the Difference in Means of Two
	    Normal Distributions with Known variances
	
	  10-2.1 Tests on the Difference in Means of Two
	  Normal Distributions with Unknown Variances
	  10.4 Paired t-test
	
	  10-6.1 Large Sample Tests on the Difference in
	    Population Proportions
	Ch 11: Simple Linear Regression and Correlation
	  11.2 Simple Linear Regression
	  11.4 Hypothesis Tests in Simple Linear Regression
		MAJOR 2

Week 8	11.5 Confidence Intervals 11.6 Prediction of New Observations 11.8 Correlation	

Final Exam: 12:30 PM	August 13, 2015	Thursday