King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
STAT319: Probability and Statistics for Engineers and Scientists
Term 143

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Office Hours : <u>Office Hours: MW 10:30 am – 11:50 am</u>
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 9:30pm to 11:00pm	15%
Second Major Exam (Chapters 6-9 + Sections 4.6&4.7) Date: July 29, 2015 from 7:00pm to 9:30pm	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

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

Week	Topic	Section

Week 01
June 07 – 11
	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 02
June 14 - 18
	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
	  3.8 Hypergeometric Distribution
	  3.9 Poisson Distribution	

Week 03
June 21 – 25
	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
	  4.5 Continuous Uniform Distribution
	  4.8 Exponential Distribution
		Major 1

Week 04
June 28 – July 02
	4.6 The Normal Distribution
	  4.7 Normal Approximation to the Binomial and
	    Poisson Distribution
	Ch 7: Sampling Distributions
	  7.1 Point Estimation
	  7.2 Sampling Distributions and the Central Limit
	    Theorem	

Week 05
July 05 - 9
	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
	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	

July 12 – 23	RAMADHAN BREAK	

Week 06
July 26 – 30
	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
		Major 2

Week 07
Aug. 02 - 06
	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
	  10-6.3 Large Sample Intervals 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	

Week 08 Aug. 9 - 12	11.5 Confidence Intervals 11.6 Prediction of New Observations 11.8 Correlation	

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