King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
STAT319: Probability and Statistics for Engineers and Scientists
Term 153

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Office Hours: Office Hours: UT 8:30 am – 9:15 am and MW 10:30 am – 11:30 am 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, 6th Edition, Wiley, 2014.

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: July 27, 2016 from 7:00pm to 9:00 pm.	15%
Second Major Exam (Chapters 6-8, part of ch.10 covered until Aug.11 + Sections 4.6 & 4.7) Date: August 14, 2016 from 7:00pm to 9:00 pm.	25%
Final Exam (Comprehensive) Date: August 31, 2016 7:00 pm	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.

Week	Topic	Section
Week 01 July 11 – 14 **July 16** **Normal Sunday Class**	**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** July 17 - 21	**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 July 24 – 28	**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 July 31 – Aug. 04	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 Aug. 07 - 11	**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 Variances 10-6.3 Large Sample Intervals on the Difference in Population Proportions	
Week 06 Aug. 14 – 18	**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 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	**Major 2**
Week 07 Aug. 21 - 25	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	
Week 08 Aug. 28 - 29	11.5 Confidence Intervals 11.6 Prediction of New Observations 11.8 Correlation	

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 in class on the first Sunday after completing a chapter.
- ✓ No late homework will be accepted.

Homework Problems

Following are the home work problems for all the chapters to be covered in STAT 319 course. Students are required to submit the solutions to these HW problems after each chapter is completed in class lecture. The specific deadlines for each chapter will be the following SUNDAY after we have completed a chapter in our class lecture.

Note that all the HW problems are selected from the textbook used in this course.

Ch. 2: 8, 25, 37, 42, 55, 63, 77, 88, 102, 108, 125, 141, 149, 153, 172.

Ch. 3: 3, 5, 12, 17, 23, 37, 42, 58, 65, 85, 109, 122, 137.

Ch. 4: 4, 10, 14, 23, 35, 43, 49, 51, 53, 61, 68, 70, 83, 87, 99, 105.

Ch. 6: 12, 14, 35, 37, 46, 55, 56.

Ch. 7: 3, 7, 10, 12.

Ch. 8: 4, 7, 11, 27, 35, 40, 58.

Ch. 9: 5, 9, 26(a), 40, 66, 67, 90, 93.

Ch. 10: 4(a-c), 17, 19, 20, 40(b), 44, 69.

Ch. 11: 8, 27, 44, 70.