King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
STAT319: Probability and Statistics for Engineers and Scientists
Term 161

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Office Hours: Office Hours: UTR 10:30 am – 11:50 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

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 2-3) Date: Oct. 13, 2016 from 6:00 PM to 7:30 PM.	10%
Second Major Exam (Chapters 4, 7, and Descriptive Statistics from Lab.) Date: Nov. 8, 2016 from 6:00 PM to 7:30 PM.	15%
Third Major Exam (Chapters 8, 9, and 10) Date: Dec. 14, 2016 from 6:00 PM to 7:30 PM.	15%
Final Exam (Comprehensive) Date: Jan. 18, 2017 at 8:00 AM.	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.

Schedule

WEEK	Topics
Week 1	**Ch 2: Probability** 2.1 Sample Space and Events (2-1.1 – 2-1.3) 2.2 Axioms of Probability 2.3 Addition Rule 2.4 Conditional Probability
Week 2	2.5 Multiplication Rule 2.6 Independence 2.7 Bayes' Theorem **Ch 3: Discrete Probability Distributions** 3.1 Discrete Random variables 3.2 Probability Mass Functions 3.3 Cumulative Distribution Functions
Week 3	3.4 Mean and Variance 3.5 Discrete Uniform Distribution 3.6 Binomial Distribution 3.7 Geometric Distribution
Week 4	3.8 Hypergeometric Distribution 3.9 Poisson Distribution **Ch 4: Continuous Probability Distributions** 4.1 Continuous Random Variables 4.2 Probability Density Functions
Week 5	4.3 Cumulative Distribution Functions 4.4 Mean and Variance 4.5 Continuous Uniform Distribution
Week 6	4.6 The Normal Distribution 4.7 Normal Approximation to the Binomial and Poisson 4.8 Exponential Distribution
Week 7	**Ch 7: Sampling Distributions** 7.1 Point Estimation 7.2 Sampling Distributions and the Central Limit Theorem
Week 8	**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
Week 9	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
Week 10	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 11	**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
Week 12	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
Week 13	10.4 Paired t-test 10-6.1 Large Sample Tests on the Difference in Population Proportions
Week 14	**Ch 11: Simple Linear Regression and Correlation** 11.2 Simple Linear Regression 11.3 Properties of the least squares estimators 11-4.1 Hypothesis Tests in Simple Linear Regression
Week 15	11.5 Confidence Intervals 11.6 Prediction of New Observations
Week 16	11-7.2 Coefficient of determination 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 homework problems for all the chapters to be covered in STAT 319 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.