King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
STAT319: Probability and Statistics for Engineers and Scientists
Term 173

Instructor: Mohammad F. Saleh
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Office Hours: 08:10 – 9:10 am SMTW (tentative)

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 and multiple 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: See STAT-319 Lab syllabus.

Assessment*

Activity	Weight
Class Evaluation (homework, quizzes, attendance, etc.)	7%
Lab Work (see Lab syllabus) + Descriptive Test	20% + 5%
First Major Exam (Chapters 2 – 4) Date and Time: 15-07-2018 Sunday (6:45 PM)	20%
Second Major Exam (Chapters 7 – 9 and 11) Date and Time: 01-08-2018 Wednesday (6:45 PM)	20%
Final Exam (Comprehensive) Date: 14-08-2018 Tuesday (12:30 PM)	28%

Grade Assignment

Score	87 – 100	80 – 86.9	75 – 79.9	70 – 74.9	65 – 69.9	60 – 64.9	55 – 59.9	50 – 54.9	0 – 49.9
Grade	A+	A	B+	B	C+	C	D+	D	F

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

The Usage of Mobiles and Electronic Devices

Students are not allowed to use mobiles for any purpose during class time. Students who want to use electronic devices for note taking have to take permission from their instructor. Violations of these rules will result in a penalty in students' class work grade.

Schedule

WEEK	Topics
Week 1 June 24 – 28 + June 30	**Ch 2: Probability** 2-1 Random Experiments, Sample Spaces, Events and Counting Techniques 2-2 Interpretations and Axioms of Probability 2-3 Addition Rules 2-4 Conditional Probability 2-5 Multiplication Rule 2-6 Independence 2-7 Bayes' Theorem **Ch 3: Discrete Probability Distributions** 3-1 Discrete Random variables 3-2 Probability Distributions and Probability Mass Functions
Week 2 July 01 – 05	3-3 Cumulative Distribution Functions 3-4 Mean and Variance of a Discrete Random Variable 3-5 Discrete Uniform Distribution 3-6 Binomial Distribution 3-7-1 Geometric Distribution Only 3-8 Hypergeometric Distribution 3-9 Poisson Distribution **Ch 4: Continuous Probability Distributions** 4-1 Continuous Random Variables 4-2 Probability Distributions and Probability Density Functions
Week 3 July 08 – 12	4-3 Cumulative Distribution Functions 4-4 Mean and Variance of a Continuous Random Variable 4-5 Continuous Uniform Distribution 4-8 Exponential Distribution 4-10 Weibull Distribution 4-6 The Normal Distribution 4-7 Normal Approximation to the Binomial and Poisson Distributions 4-11 Lognormal Distribution
Week 4 July 15 – 19	**Major 1 on Sunday 15th July** **Ch 7: Sampling Distributions** 7-1 Point Estimation 7-2 Sampling Distributions and the Central Limit Theorem **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
Week 5 July 22 – 26	**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 9-2.3 Large-Sample Test 9-3.1 Tests on the Mean of a Normal Distribution with Unknown Variance 9-5.1 Tests on a Population Proportion **Ch 11: Simple Linear Regression and Correlation** 11-1 Empirical Models 11-2 Simple Linear Regression 11-3 Properties of the least squares estimators

Week 6 July 29 – August 02	11-4 Hypothesis Tests in Simple Linear Regression 11-5 Confidence Intervals 11-6 Prediction of New Observations 11-7 Adequacy of the Regression Model 11-8 Correlation **Major 2 on Wednesday 1st August** **Ch 12: Multiple Linear Regression** 12-1 Multiple Linear Regression Model
Week 7 August 05 - 09	12-2 Hypothesis Tests in Multiple Linear Regression 12-3 Confidence Intervals in Multiple Linear Regression 12-4 Prediction of New Observations 12-5.1 Residual Analysis 12-5.2 Influential Observations (Optional)
Week 8 August 12	**Review** **Final Exam on Tuesday 14th August**

Important Notes:

- ✓ Please bring your book to every class, as well as a calculator with statistical functions.
- ✓ Excessive unexcused absences (***07***) 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.
- ✓ No late homework will be accepted.

Homework Problems

Homework # 1 (Due date Sunday 01-July-2018):
Ch. 2: 8, 25, 37, 42, 55, 63, 77, 88, 102, 108, 125, 141, 149, 153 and 172.

Homework # 2 (Due date Sunday 08-July-2018)
Ch. 3: 3, 5, 12, 17, 23, 37, 42, 58, 65, 85, 109, 122, and 137.

Homework # 3 (Due date Sunday 15-July-2018)
Ch. 4: 4, 10, 14, 23, 35, 43, 49, 51, 53, 61, 68, 70, 83, 87, 99, 105, 131 and 141.

Homework # 4 (Due date Tuesday 24-July-2018)
Ch. 7: 3, 7, 10 and 12.
Ch. 8: 4, 7, 11, 27, 35, 40 and 58.

Homework # 5 (Due date Wednesday 01-August-2018)
Ch. 9: 5, 9, 26(a), 40, 66, 67, 90 and 93.
Ch. 11: 2, 8, 24, 44 and 70.