King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
STAT319: Probability and Statistics for Engineers and Scientists
Term 181

Instructor: Mohammad Farah Saleh **Office:** 5 - 333
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Office Hours: 10:55 am – 11:55 am UTR (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
Lab Work (see Lab syllabus)	20%
Class Evaluation (homework, quizzes, attendance, participation, etc.)	10%
First Major Exam (Chapters 2 – 4 excluding Sections 4.6, 4.7 & 4.11) Date and Time: 15-10-2018 Monday (5:45 – 7:45 PM) Building 57	18%
Second Major Exam (Chapters 6 – 9 + Sections 4.6, 4.7 & 4.11) Date and Time: 26-11-2018 Monday (5:15 – 7:15 PM) Building 54	22%
Final Exam (Comprehensive) Date and Time: 22-12-2018 Saturday (07:00 PM)	30%

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.

Schedule

WEEK	Topics
Week 1 Sep 02 - 06	**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
Week 2 Sep 09 - 13	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 3-3 Cumulative Distribution Functions
Week 3 Sep 16 - 20	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
Week 4 Sep 24 – 27 + Sep 29	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 5 Sep 30 - Oct 04	4-3 Cumulative Distribution Functions 4-4 Mean and Variance of a Continuous Random Variable 4-5 Continuous Uniform Distribution
Week 6 Oct 07 – 11	4-8 Exponential Distribution 4-10 Weibull Distribution 4-6 The Normal Distribution
Week 7 Oct 14 – 18	4-7 Normal Approximation to the Binomial and Poisson Distributions 4-11 Lognormal Distribution **Major 1 on Monday 15th October** **Ch 7: Sampling Distributions** 7-1 Point Estimation
Week 8 Oct 21 – 25	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

Week 9 Oct 28 – Nov 01	8-4 Large Sample Confidence Interval for a Population Proportion **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
Week 10 Nov 04 - 08	9-2.3 Large-Sample Test 9-3.1 Tests on the Mean of a Normal Distribution with Unknown Variance
Week 11 Nov 11 - 15	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 12 Nov 18 - 22	**Major 2 on Monday 19th November** 11-4 Hypothesis Tests in Simple Linear Regression 11-5 Confidence Intervals 11-6 Prediction of New Observations
Week 13 Nov 25 - 29	11-7 Adequacy of the Regression Model 11-8 Correlation **Ch 12: Multiple Linear Regression** 12-1 Multiple Linear Regression Model
Week 14 Dec 02 - 06	12-2 Hypothesis Tests in Multiple Linear Regression 12-3 Confidence Intervals in Multiple Linear Regression
Week 15 Dec 09 - 13	12-4 Prediction of New Observations 12-5.1 Residual Analysis **Review**

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.
- ✓ Check ***Blackboard*** regularly for announcements.
- ✓ ***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 problems and due date of their submission will be posted on Blackboard later.
- ✓ No late homework will be accepted.