King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
STAT319: Probability and Statistics for Engineers and Scientists
Term 183

Instructor: **Office:**
Phone: **E-mail:**
Office Hours:

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.)	10%
Lab Work (see Lab syllabus)	20%
First Major Exam (Chapters 2 − 4 excluding sections 4.8, 4.10 & 4.11) *Date and Time: 25-06-2019 Tuesday (5:00 PM) Location: Building 54*	20%
Second Major Exam (Chapters 6 − 9 + sections 4.8, 4.10 & 4.11) *Date and Time: 08-07-2019 Monday (5:00 PM) Location: Building 54*	20%
Final Exam (Comprehensive) *As posted on the Registrar Website*	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 June 09 – 13	**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 June 16 – 20	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 June 23 – 27	4-3 Cumulative Distribution Functions 4-4 Mean and Variance of a Continuous Random Variable 4-5 Continuous Uniform Distribution 4-6 The Normal Distribution 4-7 Normal Approximation to the Binomial and Poisson Distributions 4-8 Exponential Distribution 4-10 Weibull Distribution 4-11 Lognormal Distribution *Major 1 on Tuesday 25th June*
Week 4 June 30 – July 04	**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 7 – 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 9-2.3 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 *Major 2 on Monday 08th July*

Week 6 July 14 – 18	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 **Ch 12: Multiple Linear Regression** 12-1 Multiple Linear Regression Model
Week 7 July 21 - 25	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 July 28 - 29	**Review** *As posted on the Registrar Website*

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 Thursday 13-June-2019):
Ch. 2: 8, 25, 37, 42, 55, 63, 77, 88, 102, 108, 125, 141, 149, 153 and 172.

Homework # 2 (Due date Thursday 20-June-2019)
Ch. 3: 3, 5, 12, 17, 23, 37, 42, 58, 65, 85, 109, 122, and 137.

Homework # 3 (Due date Sunday 30-June-2019)
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 Sunday 07-July-2019)
Ch. 7: 3, 7, 10 and 12.
Ch. 8: 4, 7, 11, 27, 35, 40 and 58.

Homework # 5 (Due date Thursday 18-July-2019)
Ch. 9: 5, 9, 26(a), 40, 66, 67, 90 and 93.
Ch. 11: 2, 8, 24, 44 and 70.