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

Instructor: Dr. Nasir Abbas
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Office Hours: 09:15 – 10:25 am MTW (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.

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.