King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

STAT319: Probability and Statistics for Engineers and Scientists
Spring Semester (Term 132)

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
- Basic Concepts of multiple linear regression

Text: Applied Statistics and Probability for Engineers by D. Montgomery and G. Runger, 5th Edition, Wiley, 2011.

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 and 4) Monday March 10, 2014, 6:15 pm	15%
Second Major Exam (Chapters 7 and 8 + Descriptive Statistics from Lab) Monday April 7, 2014, 6:30 pm	15%
Third Major Exam (Chapters 9 and 10) Monday May 3, 2014, 6:30 pm	15%
Final Exam (Comprehensive) Time and Location TBA	25%

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.

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.

Schedule

WEEK	Topics	Reminders
Week 1 January 26 –30	**Ch 2: Probability** 2.1 Sample Space and Events 2.2 Axioms of Probability 2.3 Addition Rule 2.4 Conditional Probability	
Week 2 February 2 – 6	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	Thursday February 6 ➢ Last day for dropping course(s) without permanent record
Week 3 February 9 – 13	3.4 Mean and Variance 3.5 Discrete Uniform Distribution 3.6 Binomial Distribution 3.7 Geometric Distribution	
Week 4 February 16 – 20	3.8 Hypergeometric Distribution 3.9 Poisson Distribution **Ch 4: Continuous Probability Distributions** 4.1 Continuous Random Variables 4.2 Probability Density Functions 4.3 Cumulative Distribution Functions	
Week 5 February 23 – 27	4.4 Mean and Variance 4.5 Continuous Uniform Distribution 4.6 The Normal Distribution 4.7 Normal Approximation to the Binomial and Poisson Distributions	
Week 6 March 2 – 6	4.8 Exponential Distribution **Ch 7: Sampling Distributions** 7.1 Point Estimation	Monday March 2 ➢ Start of midterm grade reporting, for a period of two weeks. Thursday March 6 ➢ Last day for dropping course(s) with grade of "W" thru Internet
Week 7 March 9 – 13	7.2 Sampling Distributions and the Central Limit Theorem	
Week 8 March 16 – 20	**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	
March 23 – 27	**Midterm Vacation**	

Week 9 March 30 – April 3	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 April 6 – 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	Thursday April 10 ➢ Last day for withdrawal from all courses with grade of "W" thru the Univ Registrar Office
Week 11 April 13 – 17	**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	Sunday April 13 ➢ Beginning of Early Registration ➢ Beginning of registration for Coop and Summer Training
Week 12 April 20 – 24	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 April 27 – May 1	10.4 Paired t-test 10-6.1 Large Sample Tests on the Difference in Population Proportions	
Week 14 May 4 – 8	**Ch 11: Simple Linear Regression and Correlation** 11.2 Simple Linear Regression 11.4 Hypothesis Tests in Simple Linear Regression	Thursday May 8 ➢ Last day for major exams ➢ Last day for withdrawal from all courses with grade of "WP/WF" thru the University Registrar Office
Week 15 May 11 – 15	11.5 Confidence Intervals 11.6 Prediction of New Observations 11.8 Correlation	