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

STAT319: Probability and Statistics for Engineers and Scientists
Summer Term (Term 123)

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
- 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	*5%*
Lab Work (see Lab syllabus)	*20%*
First Major Exam (Chapters 2 and 3) *Sunday June 23, 2013, 5:15 pm*	*10%*
Second Major Exam (Chapters 4, 7 + Descriptive Statistics from Lab) *Sunday July 7, 2013, 5:15 pm*	*15%*
Third Major Exam (Chapters 8, 9 and 10) *Sunday July 21, 2013, 8:30 pm*	*15%*
Final Exam (Comprehensive):	*35%*

***You need to achieve at least 50% in order to pass the course**

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 Saturday after completing a chapter.
- ✓ No late homework will be accepted.

Schedule

WEEK	Topic	Reminders
Week 1 June 8 – June 13	**Ch 2: Probability** 2.1 Sample Space and Events 2.2 Axioms of Probability 2.3 Addition Rule 2.4 Conditional Probability 2.5 Multiplication Rule 2.6 Independence 2.7 Bayes' Theorem 2.8 Random Variables **Ch 3: Discrete Probability Distributions** 3.1 Discrete Random variables 3.2 Probability Mass Functions 3.3 Cumulative Distribution Functions 3.4 Mean and Variance	
Week 2 June 15 – June 20	3.5 Discrete Uniform Distribution 3.6 Binomial Distribution 3.7 Geometric Distribution 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 4.4 Mean and Variance	
Week 3 June 22 – June 26	4.5 Continuous Uniform Distribution 4.6 The Normal Distribution 4.7 Normal Approximation to the Binomial and Poisson Distributions 4.8 Exponential Distribution **Ch 7: Sampling Distributions** 7.1 Point Estimation 7.2 Sampling Distributions and the Central Limit Theorem	First Major Exam June 23, 2013 5:15 pm Chapters 2 and 3
Week 4 June 29 – July 3	**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 6 – July 10	**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	Second Major Exam July 7, 2013 5:15 pm Chapters 4, 7 & Descriptive Statistics from the lab
Week 6 July 13 - 17	9.5.1 Tests on a Population Proportion **Ch 10: Statistical Inference for Two Samples** 10.1.1 Inference on the Difference in Means of Two Normal Distributions with Known Variances 10.2.1 Inference on the Difference in Means of Two Normal Distributions with Unknown Variances 10.4 Paired t-test 10.6.1 Inference on Two Population Proportions	
Week 7 July 20 – July 24	**Ch 11: Simple Linear Regression and Correlation** 11.2 Simple Linear Regression 11.4 Hypothesis Tests in SLR 11.5 Confidence Intervals 11.6 Prediction of New Observations 11.8 Correlation	Third Major Exam Chapters 8, 9 and 10
July 27	Review	