

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
<i>Class work</i>	5%
<i>Lab Work</i> (see Lab syllabus)	20%
<i>First Major Exam</i> (Chapters 2 and 3) <i>Sunday June 23, 2013, 5:15 pm</i>	10%
<i>Second Major Exam</i> (Chapters 4, 7 + Descriptive Statistics from Lab) <i>Sunday July 7, 2013, 5:15 pm</i>	15%
<i>Third Major Exam</i> (Chapters 8, 9 and 10) <i>Sunday July 21, 2013, 8:30 pm</i>	15%
<i>Final Exam (Comprehensive):</i>	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	<p style="text-align: center; color: red;"> First Major Exam June 23, 2013 5:15 pm Chapters 2 and 3 </p>
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	

<p>Week 5 July 6 – July 10</p>	<p>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</p>	<p>Second Major Exam July 7, 2013 5:15 pm Chapters 4, 7 & Descriptive Statistics from the lab</p>
<p>Week 6 July 13 - 17</p>	<p>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</p>	
<p>Week 7 July 20 – July 24</p>	<p>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</p>	<p>Third Major Exam Chapters 8, 9 and 10</p>
<p>July 27</p>	<p>Review</p>	