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

STAT319: Probability and Statistics for Engineers and Scientists
Fall Semester (Term 131)

**Instructor**: Mohammad f. Saleh

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**Office Hours: UTR 10:00 am – 10:50 am & M 10:00 am – 11:00 am**

Check Blackboard regularly for announcements

**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 | 5% |
| Lab Work (see Lab syllabus) | 20% |
| First Major Exam ( Chapters 2 and 3)<br>Monday September 30, 2013, 6:00 pm | 10% |
| Second Major Exam ( Chapters 4, 7 + Descriptive Statistics from Lab)<br>Monday October 28, 2013,5:30 pm | 15% |
| Third Major Exam ( Chapters 8, 9 and 10)<br>Monday December 9, 2013,5:15 pm | 15% |
| Final Exam (Comprehensive) Time and Location TBA | 35% |

**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 | Topic | Reminders |
|---|---|---|
| Week 1<br>September 1 - 5 | **Ch 2: Probability**<br>2.1 Sample Space and Events<br>2.2 Axioms of Probability<br>2.3 Addition Rule<br>2.4 Conditional Probability | |
| Week 2<br>September 8 - 12 | 2.5 Multiplication Rule<br>2.6 Independence<br>2.7 Bayes' Theorem<br><br>**Ch 3: Discrete Probability Distributions**<br>3.1 Discrete Random variables<br>3.2 Probability Mass Functions<br>3.3 Cumulative Distribution Functions | Thursday September 12<br>Last day for dropping course(s) without permanent record |
| Week 3<br>September 15 - 19 | 3.4 Mean and Variance<br>3.5 Discrete Uniform Distribution<br>3.6 Binomial Distribution<br>3.7 Geometric Distribution | |
| Week 4<br>September 22 - 26 | 3.8 Hypergeometric Distribution<br>3.9 Poisson Distribution<br><br>**Ch 4: Continuous Probability Distributions**<br>4.1 Continuous Random Variables<br>4.2 Probability Density Functions<br>4.3 Cumulative Distribution Functions | |
| Week 5<br>September 29 -<br>October 3 | 4.4 Mean and Variance<br>4.5 Continuous Uniform Distribution<br>4.6 The Normal Distribution<br>4.7 Normal Approximation to the Binomial and Poisson Distributions | |
| Week 6<br>October 6 – 9 | 4.8 Exponential Distribution<br><br>**Ch 7: Sampling Distributions**<br>7.1 Point Estimation | |
| Hajj Vacation | | |

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|---|---|---|
| Week 7<br>October 21 - 24 | 7.2 Sampling Distributions and the Central Limit Theorem | Monday October 21<br>Last day for dropping course(s) with grade of "W" thru Internet http://regweb.kfupm.edu.sa |
| Week 8<br>October 27 - 31 | **Ch 8: Statistical Intervals for a Single Sample**<br>8.1 Confidence Interval for the Mean of a Normal Distribution with Known Variance<br>8.2 Confidence Interval for the Mean of a Normal Distribution with Unknown Variance | |
| Week 9<br>November 3 - 7 | 8.4 Large Sample Confidence Interval for a Population Proportion<br>**Ch 10: Statistical Inference for Two Samples**<br>10-1.3 Intervals on the Difference in Means of Two Normal Distributions with Known Variances | |
| Week 10<br>November 10 - 14 | 10-2.3 Intervals on the Difference in Means of Two Normal Distributions with Unknown Variances<br>10-6.3 Large Sample Intervals on the Difference in Population Proportions | Thursday November 14<br>Last day for withdrawal from all courses with grade of "W" thru the Univ Registrar Office |
| Week 11<br>November 17 - 21 | **Ch 9: Tests of Hypotheses for a Single Sample**<br>9.1 Hypothesis Testing<br>9.2.1 Tests on the Mean of a Normal Distribution with Known Variance<br>9.3.1 Tests on the Mean of a Normal Distribution with Unknown Variance | Sunday November 17<br>Beginning of Early Registration for the Second Semester, 2013-2014 (132); Beginning of registration for Coop |
| Week 12<br>November 24 - 28 | 9.5.1 Tests on a Population Proportion<br><br>**Ch 10: Statistical Inference for Two Samples Continued**<br>10-1.1 Tests on the Difference in Means of Two Normal Distributions with Known Variances<br><br>10-2.1 Tests on the Difference in Means of Two Normal Distributions with Unknown Variances | |
| Week 13<br>December 1 – 5 | 10.4 Paired t-test<br><br>10-6.1 Large Sample Tests on the Difference in Population Proportions | |
| Week 14<br>December 8 – 12 | **Ch 11: Simple Linear Regression and Correlation**<br>11.2 Simple Linear Regression<br>11.4 Hypothesis Tests in SLR | Thursday December 12<br>Last day for withdrawal from all courses with grade of "WP/WF" thru the University Registrar Office |
| Week 15<br>December 15 – 19 | 11.5 Confidence Intervals<br>11.6 Prediction of New Observations | |
| December 22 – 24 | 11.8 Correlation | Tuesday December 24<br>Normal Thursday Classes |