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

STAT319: Probability and Statistics for Engineers and Scientists

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Office Hours (Tentative): UTR 11:00 AM – 1:00 PM, or by appointment

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, 6th Edition, Wiley, 2014.

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 4th week: Wednesday, Sept. 16, 17:00 – 18:30 in OAB	10%
Second Major Exam 9th week: Wednesday, Oct. 28, 17:00 – 18:30 in OAB	15%
Third Major Exam 13th week: Wednesday, Nov. 25, 17:00 – 18:30 in OAB	15%
Final Exam (Comprehensive): Thursday, December 24, 2015 , 12:30pm-2:30pm in 57-006	30%

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 Aug 23 - Aug 27	**Ch 2: Probability** 2.1 Sample Space and Events 2.2 Axioms of Probability 2.3 Addition Rule 2.4 Conditional Probability	
Week 2 Aug 30 – Sep 03	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	September 03 Last day for dropping course(s) without permanent record
Week 3 Sep 06 - 10	3.4 Mean and Variance 3.5 Discrete Uniform Distribution 3.6 Binomial Distribution 3.7 Geometric Distribution	
Week 4 Sept 13 - 17	3.8 Hypergeometric Distribution 3.9 Poisson Distribution **Ch 4: Continuous Probability Distributions** 4.1 Continuous Random Variables 4.2 Probability Density Functions	**MAJ1 (ch2 and ch3)**
EID/Hajj Vacations (Sep 18 – 28)		
Week 5 Sept 29 - Oct 01	4.3 Cumulative Distribution Functions 4.4 Mean and Variance 4.5 Continuous Uniform Distribution	
Week 6 Oct 04 – 08	4.6 The Normal Distribution 4.7 Normal Approximation to the Binomial and Poisson 4.8 Exponential Distribution	October 08 Last day for dropping course(s) with grade of "W" thru Internet
Week 7 Oct 11 - 15	**Ch 7: Sampling Distributions** 7.1 Point Estimation 7.2 Sampling Distributions and the Central Limit Theorem	
Week 8 Oct 18 - 22	**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	
Week 9 Oct 25 - 29	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	**MAJ2 (ch4, 5 and 7)**
Week 10 Nov 01 - 05	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	November 05 Last day for withdrawal from all courses with grade of "W" thru the Univ Registrar Office
Week 11 Nov 08 - 12	**Ch 9: Tests of Hypotheses for a Single Sample** 9.1 Hypothesis Testing 9.2.1 Tests on Mean of a Normal Distribution with Known Variance 9.3.1 Tests on Mean of a Normal Dist. with Unknown Variance	
Week 12 Nov 15 – 19	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 Nov 22 – 26	10.4 Paired t-test 10-6.1 Large Sample Tests on the Difference in Population Proportions	**MAJ3 (ch 8-10)**
Week 14 Nov 29 – Dec 03	**Ch 11: Simple Linear Regression and Correlation** 11.2 Simple Linear Regression 11.4 Hypothesis Tests in Simple Linear Regression	
Week 15 Dec 06 – 10	11.5 Confidence Intervals 11.6 Prediction of New Observations	
Week 16 Dec 13 - 17	11.8 Correlation Review	December 17 Last day of classes

Homework Problems

Following are the home work problems for all the chapters to be covered in STAT 319 course. Students are required to submit the solutions to these HW problems after each chapter is completed in class lecture. The specific deadlines for each chapter will be the following SUNDAY after we have completed a chapter in our class lecture.

Note that all the HW problems are selected from the textbook used in this course.

Ch. 2: 14, 25, 37, 42, 55, 63, 77, 88, 102, 108, 125, 141, 149, 153, 172.

Ch. 3: 3, 5, 12, 17, 23, 37, 42, 58, 65, 85, 109, 122, 137.

Ch. 4: 4, 10, 14, 23, 35, 43, 49, 51, 53, 61, 68, 70, 83, 87, 99, 105.

Ch. 6: 12, 14, 35, 37, 46, 55, 56.

Ch. 7: 3, 7, 10, 12.

Ch. 8: 4, 7, 11, 27, 35, 40, 58.

Ch. 9: 5, 9, 26(a), 40, 66, 67, 90, 93.

Ch. 10: 4(a-c), 17, 19, 20, 40(b), 44, 69.

Ch. 11: 8, 27, 44, 70.