

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

**STAT319: Probability and Statistics for Engineers and Scientists**  
Term 142

**Instructor:** M. Riaz  
**Phone:** 013-860-7622

**Office:** 5-332  
**E-mail:** [riazm@kfupm.edu.sa](mailto:riazm@kfupm.edu.sa)

**Office Hours:** UT. 11:00 am – 1:00 pm

**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, 5<sup>th</sup> 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 and 3) 5 <sup>th</sup> week	10%
Second Major Exam (Chapters 4, 7, and Descriptive Statistics from Lab) 8 <sup>th</sup> week	15%
Third Major Exam (Chapters 8, 9, and 10) 14 <sup>th</sup> week	15%
Final Exam (Comprehensive)	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**

<b>WEEK</b>	<b>Topics</b>	<b>Reminders</b>
<b>Week 1</b> <b>25/1 – 29/1</b>	<b>Ch 2: Probability</b> 2.1 Sample Space and Events 2.2 Axioms of Probability 2.3 Addition Rule 2.4 Conditional Probability	
<b>Week 2</b> <b>1/2 – 5/2</b>	2.5 Multiplication Rule 2.6 Independence 2.7 Bayes' Theorem <b>Ch 3: Discrete Probability Distributions</b> 3.1 Discrete Random variables 3.2 Probability Mass Functions 3.3 Cumulative Distribution Functions	<b>Thursday February 5</b> ➤ Last day for dropping course(s) without permanent record
<b>Week 3</b> <b>8/2 – 12/2</b>	3.4 Mean and Variance 3.5 Discrete Uniform Distribution 3.6 Binomial Distribution 3.7 Geometric Distribution	
<b>Week 4</b> <b>15/2 – 19/2</b>	3.8 Hypergeometric Distribution 3.9 Poisson Distribution <b>Ch 4: Continuous Probability Distributions</b> 4.1 Continuous Random Variables 4.2 Probability Density Functions 4.3 Cumulative Distribution Functions	
<b>Week 5</b> <b>22/2 – 26/2</b>	4.4 Mean and Variance 4.5 Continuous Uniform Distribution 4.6 The Normal Distribution 4.7 Normal Approximation to the Binomial and Poisson Distribution	
<b>Week 6</b> <b>1/3 – 5/3</b>	4.8 Exponential Distribution <b>Ch 7: Sampling Distributions</b> 7.1 Point Estimation	<b>Sunday March 1</b> ➤ Start of midterm grade reporting, for a period of two weeks. <b>Thursday March 5</b> ➤ Last day for dropping course(s) with grade of "W" thru Internet
<b>Week 7</b> <b>8/3 – 12/3</b>	7.2 Sampling Distributions and the Central Limit Theorem	
<b>Week 8</b> <b>15/3 – 19/3</b>	<b>Ch 8: Statistical Intervals for a Single Sample</b> 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	

<b>22/3 – 26/3 Mid term Vacations</b>		
<b>Week 9</b> <b>29/3 – 2/4</b>	8.4 Large Sample Confidence Interval for a Population Proportion <b>Ch 10: Statistical Inference for Two Samples</b> 10-1.3 Intervals on the Difference in Means of Two Normal Distributions with Known Variances	
<b>Week 10</b> <b>5/4 – 9/4</b>	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	<b>Thursday April 9</b> ➤ Last day for withdrawal from <u>all courses</u> with grade of "W" thru the Univ Registrar Office
<b>Week 11</b> <b>12/4 – 16/4</b>	<b>Ch 9: Tests of Hypotheses for a Single Sample</b> 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	
<b>Week 12</b> <b>19/4 – 23/4</b>	9.5.1 Tests on a Population Proportion <b>Ch 10: Statistical Inference for Two Samples Continued</b> 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	<b>Sunday April 19</b> ➤ Beginning of Early Registration (142) ➤ Beginning of registration for Coop and Summer Training
<b>Week 13</b> <b>26/4 – 30/4</b>	10.4 Paired t-test  10-6.1 Large Sample Tests on the Difference in Population Proportions	
<b>Week 14</b> <b>3/5 – 7/5</b>	<b>Ch 11: Simple Linear Regression and Correlation</b> 11.2 Simple Linear Regression 11.4 Hypothesis Tests in Simple Linear Regression	<b>Thursday May 7</b> ➤ Last day for major exams ➤ Last day for withdrawal from <u>all courses</u> with grade of "WP/WF" thru the University Registrar Office
<b>Week 15</b> <b>10/5 – 14/5</b>	11.5 Confidence Intervals 11.6 Prediction of New Observations 11.8 Correlation	