

STAT213: STATISTICAL METHODS for ACTUARIES
Fall Semester (Term 151)

Instructor: Dr. Saddam Akber Abbasi

Office: 5-318 **Phone:** 4546 **Email:** saddamaa@kfupm.edu.sa

Class Schedule: Sunday & Tuesday 09:00 – 09:50 am (Lecture)
Thursday 09:00 – 10:50 am (Lab)

Office Hours: Sunday & Tuesday 10:00 am – 11:30 am
Or by appointment

Course Objectives:

Introduce basic concepts of statistics methods to actuary students. Emphasize the understanding of the nature of randomness of real world problems, the formulation and analysis of real world problems using well known statistical methods to make meaningful decisions.

Learning Objectives: By completing this course, students should be able to

- Distinguish between a sample and a population
- Distinguish between a statistic and a parameter
- Design a business data collection effort by using the most appropriate data sampling strategy
- Classify business data into the most appropriate type and measurement levels
- Distinguish between continuous and discrete data
- Calculate summary descriptive statistics manually and by MINITAB
- Interpret the correct meaning of summary statistics for particular real-life business problems
- Graph a correct graphical display for the correct type of data manually and by MINITAB
- Calculate the probability for different types of events (marginal, conditional, and joint events) and for updated posterior events
- Calculate expected values of future events
- Recognize and use the correct probability distribution model for a particular application manually and by MINITAB
- Distinguish between continuous and discrete probability distribution models
- Distinguish between distribution for sample data, distribution for population data, and distribution for sample statistics
- Understand the role of central limit theorem in the distribution of sample statistics
- Evaluate the correctness and error levels of a procedure for estimating a population parameter
- Estimate parameters of a business population of interest manually and by MINITAB
- Formulate and test a hypothesis test about the mean of a normal distribution
- Formulate and test a hypothesis about a population proportion
- Formulate and test a hypothesis about the difference between two normal population means
- Formulate and test a hypothesis about the difference between two population proportions
- Formulate and test a hypothesis about a population variance
- Formulate and test a hypothesis about the ration of two population variances
- Interpret the results of hypothesis tests and explain the result in context
- Formulate a linear regression problem and interpret the estimated coefficients
- Formulate and test hypotheses about the coefficients of a linear regression problem
- Check the assumptions of a linear regression problem
- Build and interpret autoregressive time series models
- Choose an appropriate forecasting model
- Understand and interpret index numbers

Textbook and Package:

1. Basic Business Statistics: Concepts and Applications, 11th edition, by Berenson, M.L., Levine, D.M., and Krehbiel, T.C., Pearson-Prentice Hall (2009).
2. MINITAB (<http://www.minitab.com/products/minitab/student/>)
3. **Scientific calculator with statistical functions**

Assessment

Assessment for this course will be based on quizzes, homework, lab, two major exams and a comprehensive final exam, as in the following:

Activity	Weight
Homework and Attendance	5%
Lab	15%
Exam 1: (Chapters 1, 2, 3, 4 & 5) <i>Wednesday October 07, 2015</i>	20%
Exam 2: (Chapters 6, 7, 8, 9, 10, 12) <i>Wednesday November 18, 2015</i>	25%
Final Exam (Comprehensive) <i>Sunday, December 20, 2015</i>	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.
- ✓ **A formula sheet and statistical tables will be given for you in every exam, so you only need to bring with you pens, pencils, a sharpener, an eraser, and a calculator.**

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.

Syllabus

WEEK	Sections	Topics	Reminders
Week 1 Aug 23 - Aug 27	1.1 – 1.6 2.1– 2.5	Introduction and Data Collection Presenting data in tables and charts	
Week 2 Aug 30 – Sep 03	3.1 – 3.3	Numerical descriptive measures	September 03 Last day for dropping course(s) without permanent record
Week 3 Sep 06 - 10	3.4 – 3.6	Numerical descriptive measures Continued	
Week 4 Sept 13 - 17	4.1 – 4.3 5.1	Basic probability The probability distribution for a discrete random variable	
EID/Hajj Vacations (Sep 18 – 28)			
Week 5 Sept 29 - Oct 01	5.3. – 5.5 6.1 – 6.2	Binomial, Poisson and Hypergeometric distributions The normal distribution	
Week 6 Oct 04 – 08	6.3 – 6.6 7.1 – 7.2	Other distributions Sampling methods	October 07 Exam 1 October 08 Last day for dropping course(s) with grade of "W" thru Internet
Week 7 Oct 11 - 15	7.3 – 7.5	Sampling distributions	
Week 8 Oct 18 - 22	8.1 – 8.4	Confidence interval estimation	
Week 9 Oct 25 - 29	9.1 – 9.4	One sample hypothesis testing	
Week 10 Nov 01 - 05	10.1 – 10.3	Two- sample hypothesis testing	November 05 Last day for withdrawal from <u>all</u> courses with grade of "W" thru the Univ Registrar Office
Week 11 Nov 08 - 12	10.4 12.1 – 12.3 12.5	F test for difference between two variances Chi-Square tests, except Marascuilo Procedure	
Week 12 Nov 15 – 19	13.1 – 13.4	Simple linear regression	November 18 Exam 2
Week 13 Nov 22 – 26	13.7 – 13.8 14.1 – 14.2	Simple linear regression Continued Introduction to multiple regression	
Week 14 Nov 29 – Dec 03	14.4	Introduction to multiple regression Continued	
Week 15 Dec 06 – 10	16.1 – 16.3	Time-series and index numbers	
Week 16 Dec 13 - 14	16.4: Only the Linear Trend Model & 16.8	Cont. Time-series and index numbers	December 14 Last day of classes