King Fahd University of Petroleum and Minerals

Department of Mathematics

STAT 214 Syllabus, Term 252 (2025-26)

Instructor: Dr. (@kfupm.edu.sa)

Course Title: Actuarial and Business Statistics

Course Credit Hours: 3-2-4

Textbook: Basic Business Statistics: Concepts and Applications, 12th edition, by Berenson, M.L., Levine, D.M., and Krehbiel, T.C., Pearson-Prentice Hall (2011).

Software Package: R language and R studio.

Course Objective:

1. Introduce basic concepts of statistical methods to actuarial students.
2. Emphasize understanding the nature of randomness in real-world problems.
3. Formulate and analyze real-world problems using well-known statistical methods to make meaningful decisions.

Course Description: Descriptive Statistics: Graphical and numerical measures. Elementary Probability theory; sampling techniques; probability distributions; estimation; hypothesis testing for means and variances; index number and introductory time series analyses; simple linear regression and correlation analysis; multiple regression analysis; the chi-squared and F distributions and their applications; application for financial decisions; application using statistical packages.

Note: Not to be taken for credit with STAT 201.

Prerequisite: MATH 102 or MATH 106

Course Learning Outcomes: Upon successful completion of the course, a student should be able to

- Discuss the importance of data collection in business statistics and actuarial science.
- Summarize data using common graphical tools as well as describing data using numerical measures
- Determine the probabilities of event outcomes in business statistics by analyzing the sample space of random experiments.
- Compute the mean, variance, and probabilities for both discrete and continuous distributions.
- Use confidence intervals and hypothesis testing to estimate the unknown population mean and proportion.
- Understand the significance of the sample correlation coefficient and apply simple and multiple linear regression to model real-life problems, including the estimation and testing of model parameters
- Explain what is meant by a contingency (or two-way) table and use a chi-square test to test the independence of two classification criteria.

Grading Policy:

	Date	Time	Place	Material	Percentage
Exam I	Feb 15, 2026 (Sunday) (week 6)	6:30 pm	Bldg54	Chapters 2, 3, 4, 5	(70 points) 14 MCQ
Exam II	April 13, 2026 (Monday) (week 12)	7:00 pm	Bldg54	Chapters 6, 7, 8, 9	(70 points) 14 MCQ
Final Exam	As per registrar website			Comprehensive	(100 points) 20 MCQ
Lab Work (See Lab syllabus)	Assessments: Midterm Exam: 10 points, Date: TBA. Final Exam: 20 points, Date TBA.				(30 points)
Class Work	▪ It is based on quizzes, class tests, or other class activities determined by the instructor. ▪ The average (out of 30) of the class work of each section must be in the interval $[y-1, y+1]$, where $$y = \frac{\text{Median(Exam I)\%} + \text{Median(Exam II)\%}}{20} \times 3$$				(30 points)
				Total	(300 points)

Letter Grades: The letter grades will follow a grading curve, which depends on the average of all students enrolled in the course.

Exam Questions: The questions of the exams are similar to the examples and exercises in the textbook.

Cheating in Exams: Cheating or any attempt at cheating by use of illegal activities, techniques and forms of fraud will result in a grade of DN in the course along with reporting the incident to the higher university administration for further action. Cheating in exams includes (but is not restricted to):

- Looking at the papers of other students.
- Talking to other students.
- Using mobiles, smart watches or any other electronic devices.
- Using ChatGPT or any AI source.

Missing an Exam: In case a student misses an exam (Exam I, Exam II, or the Final Exam) for a legitimate reason (such as medical emergencies), he/she must bring an official excuse from Students Affairs. Otherwise, he/she will get a score of zero in the missed exam.

Other Exam Issues:

- No student will be allowed to take the exam if he/she does not bring his/her KFUPM ID, or National/Iqama ID, or Driver's License with him/her to the exam hall.
- Students are not allowed to have their mobiles, smart watches, or any electronic device in the exam hall. A violation of this will be considered an attempt at cheating.
- A student must sit in the seat assigned to him/her. A violation of this will be considered an attempt at cheating.

Some tips to enhance your problem-solving skills:

- ❖ Practice (but not memorize) more problems than those given in the list below.
- ❖ Solve some review exercises available at the end of each chapter.
- ❖ Solve the problems yourself before reading the solution or asking for help.
- ❖ If you find it difficult to handle a certain type of problem, you should try to find more problems of the same type.
- ❖ Try to make good use of the office hours of your instructor. Always bring your solution trials to discuss them with your instructor.

Attendance: Students are expected to attend all lectures and labs.

- ➢ If a student misses a class/lab, he/she is responsible for any announcement made in that class/lab.
- ➢ After being warned **twice** by the instructor, a DN grade will be awarded to any student who accumulates
  - 12 unexcused absences combined in lecture and lab (20%).
  - 20 excused and unexcused absences combined in lecture and lab (33%).

The Usage of Mobiles in Class: Students are not allowed to use mobiles for any purpose during class time. Students who want to use electronic devices to take notes must get permission from their instructor. Violations of these rules will result in a penalty decided by the instructor.

Academic Integrity: All KFUPM policies regarding ethics apply to this course. See the Undergraduate Bulletin on the Registrar's website.

Coverage Plan

Week	Topics	Suggested Problems
Week 1 Jan. 11-15	**Ch 2: Organizing and Visualizing Data** 2.2 Organizing Categorical Data 2.3 Organizing Numerical Data 2.4 Visualizing Categorical Data 2.5 Visualizing Numerical Data	**Chapter # 2** 2.5, 2.11, 2.22, 2.24, 2.27, 2.37, 2.39, 2.44
Week 2 Jan. 18-22	**Ch 3: Numerical Descriptive Measures** 3.1 Central Tendency (Mean, Median & Mode) 3.2 Variation and Shape 3.3 Exploring Numerical Data 3.4 Numerical Descriptive Measures for a Population (Mean, variance & standard deviation)	**Chapter # 3** 3.3, 3.4, 3.8, 3.13, 3.23, 3.28 3.30, 3.39, 3.40, 3.63
Week 3 Jan. 25-29	**Ch 4: Basic Probability** 4.1 Basic probability concepts 4.2 Conditional Probability 4.3 Bayes' Theorem	**Chapter # 4** 4.3, 4.8, 4.14, 4.17, 4.19, 4.23, 4.31, 4.37, 4.61
Wek 4 Feb. 01-05	**Ch 5: Discrete Probability Distributions** 5.1 Probability distribution for discrete random variable 5.3 Binomial distribution 5.4 Poisson Distribution 5.5 Hypergeometric Distribution	**Chapter # 5** 5.1, 5.3, 5.19, 5.23, 5.24, 5.30, 5.33, 5.42, 5.43
Week 5 Feb.08-12	**Ch 6: The Normal Distribution and Other Continuous Distributions** 6.1 Continuous Random Variables (PDF, mean, Variance & percentiles) (Extra material) 6.2 Normal distribution 6.5 Exponential Distribution	**Chapter # 6** 6.1, 6.5, 6.6, 6.9, 6.29, 6.33, 6.51
Week 6 Feb.15-19	**Ch 7: Sampling and Sampling Distributions** 7.1 Types of Sampling Methods 7.3 Sampling Distributions 7.4 Sampling Distribution of the Mean 7.5 Sampling Distribution of the Proportion	**Chapter # 7** 7.18, 7.19, 7.20, 7.21, 7.25, 7.27, 7.45
Sunday, Feb. 22, 2026; Saudi Founding Day Holiday		

Week 7 Feb. 23-26	**Ch 8: Confidence Interval Estimation** 8.1 Confidence interval Estimate of the Mean (σ known) 8.2 Confidence interval Estimate of the Mean (σ unknown)	
Week 8 Mar.01-05	8.3 Confidence interval Estimate for the Proportion 8.4 Determining Sample Size **Ch 9: Fundamentals of Hypothesis Testing: One-Sample Tests** 9.1 Fundamentals of Hypothesis-Testing Methodology	**Chapter # 8** 8.5, 8.9, 8.12, 8.23, 8.30, 8.32, 8.38, 8.43, 8.48
Week 9 Mar. 08-12	9.2 t Test of Hypothesis for the Mean (σ Unknown) 9.3 One-Tail Tests 9.4 Z Test of Hypothesis for the Proportion	**Chapter # 9** 9.2, 9.6, 9.8, 9.14, 9.16, 9.18, 9.24, 9.26, 9.36, 9.40, 9.44, 9.48, 9.50, 9.54, 9.58, 9.72
March 15 – March 26, 2026; Eid Al-Fitr Holidays		
Week 10 Mar. 29- Apr. 02	**Ch 10: Two-Sample Tests** 10.1 Comparing the Means of Two Independent Populations 10.2 Comparing the Means of Two Related Populations 10.3 Comparing the Proportions of Two Independent Populations	
Week 11 Apr. 05- 09	10.4 F Test for the Ratio of Two Variances **Ch 12: Chi-Square Tests and Nonparametric Tests** 12.1 Chi-square test for the difference between two proportions 12.3 Chi-square test of independence	**Chapter # 10** 10.2, 10.10, 10.12, 10.20, 10.30, 10.32, 10.36, 10.38, 10.46
Week 12 Apr.12-16	**Ch 13: Simple Linear Regression** 13.1 Types of Regression Models 13.2 Determining the Simple Linear Regression Equation 13.3 Measures of Variation	**Chapter # 12** 12.2, 12.3, 12.6, 12.22, 12.25
Week 13 Apr. 19-23	13.4 Assumptions 13.5 Residual Analysis 13.7 Inferences About the Slope and Correlation Coefficient 13.8 Estimation of Mean Values and Prediction of Individual Values	**Chapter # 13** 13.1, 13.2, 13.4, 13.16, 13.26, 13.40, 13.42, 13.55, 13.56, 13.58
Week 14 Apr.26- 30	**Ch 14: Introduction to Multiple Regression** 14.1 Developing a Multiple Regression Model 14.2 R^2, Adjusted R^2, and the Overall F Test 14.4 Inferences Concerning the Population Regression Coefficients	**Chapter # 14** 14.1, 14.2, 14.6, 14.10, 14.16
Week 15 May. 03-07	**Ch 16: Time-Series Forecasting** 16.2 Component of Time-Series 16.3 Smoothing an Annual Time Series 16.4 Least-Squares Trend Fitting and Forecasting (The Linear Trend Model) 16.8 Index Numbers	**Chapter # 16** 16.1, 16.2, 16.3, 16.4, 16.10, 16.12 (a, b), Online topic (index numbers): 16.67, 16.69
Week 16 May 10	Review / Catching up	