BA 578 - 81E

Statistical Methods

Fall, 2013

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Office Hours: M 8:30 am - 1 pm

TR 8:30 am - 9:30 am

T 5:30 pm - 6:15 pm (UCD)

R 12:00 noon – 1:00 pm

Required Text: Business Statistics, In Practice Bruce L. Bowerman, Richard T. O'Connell, Emily S. Murphree, McGraw-Hill Irwin, 6th edition, ISBN- 978-0-07-340183-6

Course Description: A course dealing with statistical concepts including measures of central tendency and dispersion, probability distributions, the Central Limit Theorem, sampling, estimation, hypothesis testing, analysis of variance, correlation and regression analysis, multiple regression and statistical forecasting.

Rubric:

Criteria (Course Objectives)	**1 (Unsatisfactory)**	**2 (Emerging)**	**3 (Proficient)**	**4(Exemplary)**
1) Learn how to calculate and apply measures of location and measures of dispersion -- grouped and ungrouped data cases.	Student cannot and apply any measures of location and measures of dispersion for grouped and ungrouped data.	Student can and apply some measures of location and measures of dispersion for grouped and ungrouped data.	Student can and apply most measures of location and measures of dispersion for grouped and ungrouped data.	Student can and apply all measures of location and measures of dispersion for grouped and ungrouped data.
2) Learn how to apply discrete and continuous probability distributions to various	Student cannot apply discrete and continuous probability	Student can apply discrete and continuous probability	Student can apply discrete and continuous probability	Student can apply discrete and continuous probability

business problems.	distributions to any business problems.	distributions to some business problems.	distributions to most of business problems.	distributions to all of business problems.
3)Understand the hypothesis testing: 3.1 Be able to perform Test of Hypothesis 3.2 calculate confidence interval for a population parameter for single sample and two sample cases. 3.3 Understand the concept of p-values.	3.1 Student cannot perform the test of hypothesis 3.2 Student cannot calculate confidence interval for a population parameter for single sample and two sample cases. 3.3 Student doesn‘t understand the concept of p-value.	3.1 Student can perform some test of hypothesis 3.2 Student can calculate some confidence interval for a population parameter for single sample and two sample cases. 3.3 Student understands some part of the concept of p-value.	3.1 Student can perform most test of Hypothesis 3.2 Student can calculate most confidence interval for a population parameter for single sample and two sample cases. 3.3 Student understands most part of the concept of p-values.	3.1 Student can perform all test of Hypothesis 3.2 Student can calculate all confidence interval for a population parameter for single sample and two sample cases. 3.3 Student understands the entire concept of p-values.
4) Learn non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.	4) Student doesn‘t know non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.	4) Student knows some parts of non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.	4) Student knows most parts of non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.	4) Student knows all parts of non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.
5) Understand regression analysis: 5.1 Be able to compute and interpret the results of Bivariate Regression	5.1 Student cannot compute and interpret the results of Bivariate	5.1 Student can compute and interpret some of the results of Bivariate	5.1 Student can compute and interpret most of the results of Bivariate	5.1 Student can compute and interpret all of the results of Bivariate

	Regression	Regression	Regression	Regression
5.2 Be able to compute and interpret the results of Multivariate Regression.	5.2 Student cannot compute and interpret the results of Multivariate Regression	5.2 Student can compute and interpret some of results of Multivariate Regression	5.2 Student can compute and interpret most of results of Multivariate Regression	5.2 Student can compute and interpret all of results of Multivariate Regression
5.3 Be able to compute and interpret Correlation Analysis	5.3 Student cannot compute and interpret Correlation Analysis	5.3 Student can compute and interpret some parts of Correlation Analysis	5.3 Student can compute and interpret most parts of Correlation Analysis	5.3 Student can compute and interpret all parts of Correlation Analysis
5.4 Be able to perform ANOVA and F-test.	5.4 Student cannot solve any questions regarding ANOVA and F-test.	5.4 Student can solve easy questions regarding ANOVA and F-test.	5.4 Student can solve medium-hard questions regarding ANOVA and F-test.	5.4 Student can solve difficult questions regarding ANOVA and F-test.
5.5 Be able to understand both the meaning and applicability of a dummy variable.	5.5 Student cannot apply the dummy variable to solve any questions.	5.5 Student cannot apply the dummy variable to solve some questions.	5.5 Student cannot apply the dummy variable to solve most questions.	5.5 Student cannot apply the dummy variable to solve all the questions.
5.6 Be able to understand the assumptions which underline a regression model.	5.6 Student doesn • ft understand the assumptions which underline a regression model.	5.6 Student understands some parts of the assumptions which underline a regression model.	5.6 Student understands most parts of the assumptions which underline a regression model.	5.6 Student understands all parts of the assumptions which underline a regression model.
5.7 Be able to perform a multiple regression using computer software.	5.7 Student is unable to	5.7 Student is able to perform	5.7 Student is able to perform	5.7 Student is able to perform

	perform a multiple regression using computer software.	a multiple regression using computer software for easy questions	a multiple regression using computer software for medium-hard questions	a multiple regression using computer software for difficult questions

Statement of Ethical and Professional Conduct:

The College of Business and Entrepreneurship at Texas A&M University – Commerce faculty, staff and students will follow the highest level of ethical and professional behavior. We will strive to be recognized as a community with legal, ethical and moral principles and to teach and practice professionalism in all that we do.In an academic environment we will endeavor to not only teach these values but also to live them in our lives and daily work. Faculty and staff will be held to the same standards and expectations as our students.

Failure to abide by these principles will result in sanctions up to and including dismissal.

Actionable Conduct:

These are five different types of actions that will bring sanction. They are:

1. Illegal activity: Violation of any local, state or federal laws that prohibit the offender from performance of his or her duty.

2. Dishonest conduct: Seeking or obtaining unfair advantage by stealing or receiving copies of tests or intentionally preventing others from completing their work. In addition falsifying of records to enter or complete a program will also be considered dishonest conduct.

3. Cheating: The unauthorized use of another's work and reporting it as your own

4. Plagiarism: Using someone else's ideas and not giving proper credit.

5. Collusion: Acting with others to perpetrate any of the above actions regardless of personal gain.

Sanctions:

In the case of staff or faculty the immediate supervisor will be the arbiter of actionable behavior and will use Texas A&M University - Commerce and/or Texas A&M University System Policy and Procedures as appropriate to guide sanctions.

Faculty, guided by clearly delineated policy in the course syllabus, will be arbiter for in-class violations. All violations will be reported to the Dean of the College of Business and Technology to assure equity and to provide appropriate counsel. In addition, the Dean will maintain the records of violations by students. Second violations will be reviewed by the Dean and sanctions beyond those of the faculty up to and including suspension and permanent expulsion from Texas A&M University – Commerce will be considered. Faculty and students are guided by the current undergraduate and graduate catalogs of the university as well as The Students Guidebook. Faculty, Staff and Students will always be afforded due process and review as appropriate.

Grading Policy:

Evaluation of student performance will be based primarily upon two equally weighted tests (45% each). The remaining 10% will be awarded for the ASSIGNED PROBLEMS. Grades for the course will be determined by achieving the following average ranges:

Average Range	Grade
90-100	A
80-89	B
70-79	C
60-69	D
Below 60	F

Special Accommodations:

Students with Disabilities:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University - Commerce

Gee Library, Room 132

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: StudentDisabilityServices@tamuc.edu

NOTE THE FOLLOWING

1. The assignments listed are tentative for the semester. It is meant to be a guide. Certain topics may be stressed more or less than indicated in the text and depending on class progress certain topics may be omitted.
2. Homework: problems have been identified to work on your own for practice and to support your understanding of chapter material. They are not to be turned in. Additional problems may be identified as the class progresses. Solutions may be viewed on the syllabus link "solved problems".
3. A power point presentation and solutions to text problems are available online.
4. **ASSIGNED PROBLEMS**: Certain problems will be assigned to be turned in. These problems will constitute 10% of the course grade.
5. The midterm exam date indicated on the course syllabus is approximate. You will be informed, at least one week before the exam.
6. Missed examination: Inform instructor if midterm or final exam are to be missed.
7. Students are expected to
a. Read text assignments as scheduled.
b. Work the designated homework problems prior to class (Note: Answers to odd questions may be found in back of text).

8. Classroom Demeanor: "All students enrolled at the university shall follow tenets of common decency and acceptable behavior conducive to a positive learning environment". See Students Guide Book.
9. Attendance Policy: You are expected to be present for all class meetings of this course. You will be allowed to make up work for classes you miss only if your absence is excusable. Excusable absences are defined in the current University Catalog.
10. Special Needs: "Request from students with disabilities for reasonable accommodations must go through the academic support committee. For more information, please contact the office of Advisement Services, BA 314, 903 – 886 – 5133.

Schedule of Assignments:

The schedule will depend on class progress; chapter assignments and tests may be altered as the class progresses. Students should read chapters and do as many of the designated homework problems as possible and be familiar with the chapter summaries and key terms.

UNIT 1
(Chapters 1- 8)

Text Assignment	Designated Homework Problems	Date (Week of)	Chapter Goals
Chapter 1 Introduction to Business Statistics	**1:** 1, 2, 3, 4, 5, 15, 16, 17,18	Aug 26	1. Define inferential and descriptive statistics. 2. Differentiate between a quantitative and a qualitative variable. 3. Differentiate between a discrete and a continuous variable. 4. Know the four levels of measurement – nominal, ordinal, interval, and ratio.
Chapter 2 Descriptive Statistics: Tabular and Graphical Methods	**2:** 1, 2, 17, 34	Aug 26	1. Construct a frequency distribution. 2. Determine the class midpoints, relative frequencies, and cumulative frequencies of a frequency distribution. 3. Construct a histogram, a frequency polygon, an ogive, and a pie chart.

Chapter 3 Descriptive Statistics: Numerical Methods	**3:** 2, 3, 8, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27, 28, 30, 31	Sept 2	1. Define the mean, mode, and median. 2. Explain the characteristics of the mean, mode, and median. 3. Calculate the mean, mode and median for both grouped and ungrouped data. 4. Define the range, mean deviation, variance, and the standard deviation. 5. Explain the characteristics of the range, mean deviation, variance, and the standard deviation. 6. Calculate the range, mean deviation, variance, and the standard deviation for grouped and ungrouped data. 7. Define Skewness and Kurtosis. 8. Define and calculate the coefficient of variation.
Chapter 4 Probability	**4:** 2, 3, 8, 9, 11, 13, 18, 19, 20, 21, 24, 25, 27, 75, 76	Sept 2	1. Define probability. 2. Define marginal, conditional, and joint probabilities. 3. Use the special and general rules of multiplication and addition in probability computation. 4. Calculate marginal, conditional, and joint probabilities.

Chapter 5 Discrete Random Variables	**5:** 1, 2, 3, 9, 13, 23, 24, 25, 26, 28, 29, 31, 34, 35, 52, 53, 54, 55 **Hand in assigned problem # 1 in class on Sept 10 include manual, excel and mega stat solutions**	Sept 9	1. Define probability distribution and random variable. 2. Calculate the mean, variance, and standard deviation of a discrete distribution. 3. Describe the characteristics and compute probabilities using the binomial probability distribution – use of tables. 4. Calculate the mean variance and standard deviation of a binomial distribution. 5. Describe the characteristics and compute probabilities using the Poisson distribution – use of tables.
Chapter 6 Continuous Random Variables	**6:** 1, 16, 17, 18, 19, 23, 24, 26, 28, 29, 30, 31, 33, 34, 40, 67, 71	Sept 16	1. Describe the characteristics of and compute probabilities involving the normal distribution – use of tables. 2. Use the normal distribution as an approximation of the binomial distribution.
Chapter 7 Sampling Distributions (Section 1.5)	**7:** 1, 2, 9, 11, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 30, 31, 34, 35	Sept 23	1. Describe various sampling techniques. 2. Explain the Central Limit Theorem. 3. Explain sampling error. 4. Describe the sampling distribution of means. 5. Define the standard error of the mean.

Chapter 8 Confidence Intervals	**8:** 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20, 21, 22, 25, 28, 29, 30, 34, 38, 39, 40, 41, 44	Sept 30	1. Calculate confidence intervals for sample means and sample proportions. 2. Describe the characteristics of Student's t distribution. 3. Use the Student's t probability table to calculate confidence interval
Midterm exam		Tuesday, Oct 8	**Subject to class progress**

UNIT 2
(Chapters 9 -15)

Text Assignment	Designated Homework Problems	Date (week of)	Chapter Goals
Chapter 9 Hypothesis Testing	**9:** 1, 2, 10, 11, 15, 18, 19, 20, 21, 22, 23, 25, 38, 39, 42	Oct 14	1. Identify Type I and Type II errors. 2. Conduct a test of hypothesis about a population mean and a population proportion. 3. Conduct the test of hypothesis using one and two tail tests. 4. Conduct the test of hypothesis regarding one population mean with a small sample.
Chapter 10 Statistical Inferences Based on Two Samples	**10:** 6, 8, 9, 16, 21, 22, 38, 41, 42,	Oct 21	1. Conduct a test of hypothesis about the difference between two population means involving large and small sample sizes and two population proportions. 2. Conduct the test of hypothesis regarding the difference in means of two independent samples.

Chapter11 Experimental Design and Analysis of Variance	**11:** 3, 5, 6, 10 **Hand in assigned problems # 2, 3 and 4 on Oct 29 include manual, excel and mega stat solutions**	Oct 28	1. Understand the differences between various experiment designs and when to use them. 2. Compute and interpret the results of a one-way ANOVA. 3. Compute and interpret the results of a random block design. 4. Compute and interpret the results of a two-way ANOVA.
Chapter 12 Chi-Square Analysis	**12:** 3, 4, 6, 7, 17, 19, 20, 24, 25	Oct 28	1. Understand and interpret interaction. 2. Understand the chi-square goodness-of-fit test and how to use it. 3. Analyze data by using the chi-square test of independence.
Chapter 13 Simple Linear Regression Analysis (sections 2.6 and 3.4)	**13:** 1, 2, 4, **7,** 8, 12, 15, 20, 21, 24, 31, 34, 36, 37, 38, 39, 40, 42 **Hand in assigned problems # 5 & #6 on Nov 5 include manual, excel and mega stat solutions**	Nov 4	1. Describe the relationship between an independent variable and a dependent variable. 2. Calculate and interpret the coefficient of correlation, the coefficient of determination and the standard error of the estimate. 3. Calculate the least squares regression line and interpret the slope and intercept values. 4. Test the slope of the line for statistical significance. 5. Construct and interpret a confidence interval and prediction interval for the mean and an individual value of the dependent variable.
Chapter 13 Simple Linear Regression Analysis (sections 2.6 and 3.4)	**Hand in assigned problem #7 on Nov 12 include manual, excel and mega stat**	Nov 11	1. Regression and Correlation applications 2. Analysis of sums of squares for calculating the coefficient of determination and the stand error of

	solutions		the estimate. 3. A thorough analysis of the regression and correlation computer solutions provided by Mega Stat and by excel.
Chapter 14 Multiple Regression	**14:** 3, 4, 5, 9, 10, 11, 19, 20, 22, 23	Nov 18	1. Describe the relationship between two or more independent variables and the dependent variable using a multiple regression equation. 2. Compute and interpret the multiple standard error of the estimate and the coefficient of determination. 3. Conduct a test of hypothesis to determine if any of the set of regression coefficients differs from zero.
Chapter 15 Model Building and Model Diagnostics	**15:** 3, 6, 7, 8 **Hand in assigned problem # 8 on Nov 26 include excel and mega stat solutions only**	Nov 25	1. Develop models to represent non-linear relationships. 2. Regression and multiple regression model assumptions.
Chapter 15 Model Building and Model Diagnostics	**Hand in assigned problems #9 and #10 on Dec 3 include excel and mega stat solutions only**	Dec 2	1. Continuing discussion of non-linear relationships 3. Dummy variables 4. Adjusted r square
Final Exam		**Tuesday Dec 10**	