

**BA 578- 61E (CRN # 22304): Statistical Methods
Course Syllabus (Spring 2016): 1/19/2016 – 5/13/2016**

Professor: Dr. Kishor Kumar Guru-Gharana

Office: BA 208

Class hours: W 6:15 P.M. – 8:55 P.M. at Midlothian, Texas

Office Hrs: Mon-Wed-Fri 9:00 A.M. -11:00 A.M.

Phone: 903.886.5687 (off); 903.886.5601 (fax)

Email: kishor.guru-gharana@tamuc.edu

Required Text:

Business Statistics, In Practice Bruce L. Bowerman, Richard T. O'Connell, Emily S. Murphree, McGraw-Hill Irwin, 7th edition (ISBN-13: **978-0073521497**). I think the book comes without the student CD (with free MegaStat). If so, you have to get the MegaStat online which costs about \$12-15

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.

Course Objectives: Student Learning Outcomes

The objective of this course is to provide an understanding for the graduate business student on statistical concepts to include measurements of location and dispersion, probability, probability distributions, sampling, estimation, hypothesis testing, regression, and correlation analysis, multiple regression and business/economic forecasting. By completing this course the student will learn to perform the following:

- 1) How to calculate and apply measures of location and measures of dispersion -- grouped and ungrouped data cases.
- 2) How to apply discrete and continuous probability distributions to various business problems.
- 3) Perform Test of Hypothesis as well as calculate confidence interval for a population parameter for single sample and two sample cases. Understand the concept of p-values.
- 4) Learn non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.
- 5) Compute and interpret the results of Bivariate and Multivariate Regression and Correlation Analysis, for forecasting and also perform ANOVA and F-test. Further, understand both the meaning and applicability of a dummy variable and the assumptions which underline a regression model. Be able to perform a multiple regression using computer software.

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 calculate and apply any measures of location and measures of dispersion for grouped and ungrouped data.	Student can calculate and apply some measures of location and measures of dispersion for grouped and ungrouped data.	Student can calculate and apply most measures of location and measures of dispersion for grouped and ungrouped data.	Student can calculate and apply measures of location and measures of dispersion for grouped and ungrouped data.
2) Learn how to apply discrete and continuous probability distributions to various business problems.	Student cannot apply discrete and continuous probability distributions to any business problems.	Student can apply discrete and continuous probability distributions to some business problems.	Student can apply discrete and continuous probability distributions to most of business problems.	Student can apply discrete and continuous probability distributions to all of business problems.
3)Understand the hypothesis testing:				
3.1 Be able to perform Test of Hypothesis	3.1 Student cannot perform the test of hypothesis	3.1 Student can perform some test of hypothesis	3.1 Student can perform most test of Hypothesis	3.1 Student can perform all test Hypothesis
3.2 calculate confidence interval for a population parameter for single sample and two sample cases.	3.2 Student cannot calculate confidence interval for a population parameter for single sample and two sample cases.	3.2 Student can calculate some confidence interval for a population parameter for single sample and two sample cases.	3.2 Student can calculate most confidence interval for a population parameter for single sample and two sample cases.	3.2 Student can calculate all confidence interval for a population parameter for single sample and two sample cases.

3.3 Understand the concept of p-values.	3.3 Student doesn't understand the concept of p-value.	3.3 Student understands some part of the concept of p-value.	3.3 Student understands most part of the concept of p-values.	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.	Student doesn't know non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.	Student knows some parts of non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.	Student knows most parts of non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.	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 Regression	5.1 Student can compute and interpret some of the results of Bivariate Regression	5.1 Student can compute and interpret most of the results of Bivariate Regression	5.1 Student can compute and interpret all of the results of Bivariate 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 can apply the dummy variable to solve some questions.	5.5 Student can apply the dummy variable to solve most questions.	5.5 Student can 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't 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 perform a multiple regression using computer software.	5.7 Student is able to perform a multiple regression using computer software for easy questions.	5.7 Student is able to perform a multiple regression using computer software for medium-hard questions.	5.7 Student is able to perform a multiple regression using computer software for difficult questions.

Nondiscrimination Statement:

A&M-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Statement of Ethical and Professional Conduct:

The College of Business and technology 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: There 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: using someone else’s ideas and not giving proper credit.
4. Plagiarism: using someone else’s ideas and not giving proper credit.
5. Conclusion: 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:

Grade Component	Points
Four Assignments (4*75 = 300)	300
Midterm-Exam (Chapters 1-8)	300
Final Exam (only Chapters 9-14)	400

Final grade in the course is the average from the student’s total score from the sum of (Assignments + Midterm + Final) above.

<u>Average Range</u>	<u>Grade</u>
90%-100%	A
80%-89%	B
70%-79%	C
60%-69%	D
Below 60%	F

EXAMS SCHEDULE

Exams	Exams sent to class through email on	Due by	Chapters Covered

Midterm Exam (Seven hours)	5 pm Wednesday, March 9th, 2016	11:59 pm Wednesday, March 9th, 2016	1, 2, 3, 4, 5, 6, 7, 8
Final Exam (Seven hours)	5 pm Wednesday, May 11th, 2016	11:59 pm Wednesday, May 11th, 2016	9, 10, 13, 14, and 15 (7th ed.)

NOTE THE FOLLOWING

1. Feel free to ask questions through **EMAIL**. I am accessible 24/7 even during weekends or holidays. You can ask any question related to the course topics in the virtual office and I try to respond within few hours (maximum 24 hours). In the virtual office or students' forum you can also try to answer others' questions. But you are expected to maintain etiquette and decency in your responses. **Statistics involves a lot of mathematical symbols and formulas and is difficult to explain verbally over telephone.** Therefore, the online channels are the best methods for asking questions as I can type the statistical symbols/numbers/equations and examples in my responses.
2. This syllabus is tentative for the semester. It is meant to be a guide. Certain topics may be stressed more or less than indicated in the text books and, depending on class progress, certain topics may be omitted.
3. Homework: Homework problems (Assignments) are assigned and graded on tri-weekly basis. Solution to Assignment problems will be provided after the deadline for submission.
4. Missed examination: Missing Homework Assignment and Midterm will result in zero score while missing the Final will result in grade "F". There will be no make-up Exam and late homework assignments will not be accepted.
5. I provide detailed Instructions with examples for each Chapter. I post the links to the Chapter Instructions in the main **Announcement Section** and also in the corresponding weekly section of the e-college.
6. Power point Slides for the course will be uploaded gradually as required.
7. The indicated dates are tentative and may be rescheduled later.
8. Students are expected to:
 - a. Read text assignments as scheduled.
 - b. Read the chapter Instructions provided by the Professor
 - c. Work the designated homework problems by the due date. (Note: Answers to odd questions among end-of-chapter questions may be found in back of text but I will provide solutions to all chapter questions during the middle of the corresponding week).
 - d. Read the regular (almost daily) announcements in the **Announcement section** of the e-college and download the posted materials with download links.
9. **Demeanor/Student Conduct:** All students enrolled at the University shall follow the tenets of

common decency and acceptable behavior conducive to a positive learning environment. (See *Code of Student Conduct from Student Guide Handbook*).

10. **Attendance Policy:** In the online course there is no class attendance. But assignments and tests have corresponding due dates.

11. **Excel and MegaStat** will be used to solve problems along with calculator and formulas. Learn both techniques. These programs are available with the CD which comes free with the textbook. Therefore, buy a book which has CD included. If the book is available only without CD then get the MegaStat online. It is very cheap (costs about \$12). To order the CD (or online download) you can go to:

<https://paris.mcgraw-hill.com/paris/codevalidationview.do?productid=0077425995&userType=student&exsysid=null&exuid=null>

Some students have also suggested the following link:

<http://cs.berry.edu/~pkapitza/Fall06/stat/instructions.html>

Some students have even reported that they have downloaded **for free** from these sites:

http://glencoe.mcgraw-hill.com/sites/0010126585/student_view0/megastat.html

http://highered.mcgraw-hill.com/sites/0070000237/student_view0/megastat_tutorials.html

There may be other similar sites which can be found by searching the term MegaStat download in Internet. They usually cost around \$12 but you may be able to find free downloads. The links I have provided are from previous semester. Therefore, you have to explore yourself whether the links are still working. **For problems with Megastat please contact orris@butler.edu.**

12 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

StudentDisabilityServices@tamuc.edu

Topical Outline and 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 power point slides, and Instructions provided by the Professor.

Chapter	Mode of Instruction/Test	Date/Due date	Chapter Goals/ Topics
<u>Chapter 1</u> Introduction to Business Statistics	Class lectures/handouts /email attachments	Jan 19- Feb 9	1. Define inferential and descriptive statistics. 2. Differentiate between a quantitative and a qualitative variable. 3. Know the four levels of measurement: - nominal, ordinal, interval, and ratio.
<u>Chapter 2</u> Descriptive Statistics: Tabular and Graphical Methods	Class lectures/handouts /email attachments	Jan 19- Feb 9	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.

<p><u>Chapter 3</u> Descriptive Statistics: Numerical Methods</p>	<p>Class lectures/handouts /email attachments</p>	<p>Jan 19- Feb 9</p>	<ol style="list-style-type: none"> 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.
<p><u>Chapter 4</u> Probability</p>	<p>Class lectures/handouts /email attachments</p>	<p>Jan 19- Feb 9</p>	<ol style="list-style-type: none"> 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. 5. Work Problems in Bayesian Probabilities (Handout provided- also mentioned in Ch 19 of the book)
<p>Home Assignment1</p>	<p>Emailed to class</p>	<p>Tuesday, Feb 9 2016 by 11:59 pm via email attachment</p>	<p>Chapters 1, 2, 3 and 4</p>

<u>Chapter 5</u> Discrete Random Variables	Class lectures/handouts /email attachments	Feb 10- March 8	<ol style="list-style-type: none"> 1. Define probability distribution and random variable. 2. Differentiate between a discrete and a continuous variable. 3 Calculate the mean, variance, and standard deviation of a discrete distribution. 4. Describe the characteristics and compute probabilities using the binomial probability distribution – use of tables. 5. Calculate the mean variance and standard deviation of a binomial distribution.
<u>Chapter 6</u> Continuous Random Variables	Class lectures/handouts /email attachments	Feb 10- March 8	<ol style="list-style-type: none"> 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.
<u>Chapter 7</u> Sampling Distributions	Class lectures/handouts /email attachments	Feb 10- March 8	<ol style="list-style-type: none"> 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.
<u>Chapter 8</u> Confidence Intervals	Class lectures/handouts /email attachments	Feb 10- March 8	<ol style="list-style-type: none"> 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
Home Assignment2	Emailed to class	Tuesday, March 8 by 11:59 pm	Chapters 5, 6, 7 and 8

Midterm Exam Time Limit: 7 hours, once the test starts (Single Take and Single-Stretch Exam)	Emailed to class before 6 p.m.	5 p. m. Wednesday, March 9th till 11:59 p.m. Wednesday, March 9th , 2016	Chapters 1-8
Spring break	Spring break	March 14-18	
<u>Chapter 9</u> Hypothesis Testing	Class lectures/handouts /email attachments	March 21- April 12	1. Identify Type I and Type II errors. 2. Conduct hypothesis test about population mean and proportion. 3. Conduct hypothesis test using one and two tail tests. 4. Conduct hypothesis test regarding one population mean with a small sample.
<u>Chapter 10</u> Statistical Inferences Based on Two Samples	Class lectures/handouts /email attachments	March 21- April 12	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.
<u>Chapter 13</u> (7 th ed.) Chi-square Tests	Class lectures/handouts /email attachments	March 21- April 12	1. Understand the χ^2 goodness-of-fit test. 2. Analyze data by using the χ^2 test of independence. 3. Perform χ^2 test on Contingency Tables
Home Assignment 3 (Chapters 9, 10, and 13 of 7th ed.)	Uploaded in e- college Announcement	Tuesday, April 12th by 11:59 pm	Chapters 9, 10 and 13 of 7th ed.
Chapter 14 (7 th ed.) Simple Linear Regression Analysis	Class lectures/handouts /email attachments	April 13- May 10	1. Describe the relationship between independent and dependent variables. 2. Calculate and interpret coefficient of correlation,

			<p>coefficient of determination and the standard error of the estimate.</p> <ol style="list-style-type: none"> 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.
<p>Chapter 15 (7th ed.) Multiple Regression</p>	<p>Class lectures/handouts /email attachments</p>	<p>April 11- May 10</p>	<ol style="list-style-type: none"> 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 hypothesis tests to determine significance of regression coefficients 4. Perform ANOVA and F-Test
<p>Home Assignment4 (Chaps. 14 & 15 of 7th ed.)</p>	<p>Emailed to class</p>	<p>Tuesday, May 10th by 11:59 pm</p>	<p>Home Assignment4 (Chapters 14 & 15 of 7th ed.)</p>
<p>Final Exam: Time limit 7 hrs. once you start the Test (Single Take and Single-Stretch Exam)</p>	<p>Emailed to class before 5 p.m.</p>	<p>5 p.m. till 11:59 p.m. Wednesday, May 11th 2016</p>	<p>Chs. 9, 10, 13, 14, and 15 of 7th ed.</p>