

**BA 578- 01E: Statistical Methods (CRN # 50086)**  
**Course Syllabus (Summer-II, 2015): 7/13/2015- 8/13/2015**

**Professor: Dr. Kishor Kumar Guru-Gharana**

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**Office Hrs: Virtual Office Hours (24/7 for the whole semester)**

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**Required Text:**

Business Statistics, In Practice Bruce L. Bowerman, Richard T. O'Connell, Emily S. Murphree, McGraw-Hill Irwin, 6th edition, ISBN 10: **0073401838** or ISBN 13: **9780073401836** or 7<sup>th</sup> edition (ISBN-13: **978-0073521497**) of the same book. The book comes without the student CD (with free MegaStat). You have to get the MegaStat online which costs about \$12.

**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 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 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 of Hypothesis
3.2 calculate confidence interval for a population parameter for single sample & two samples.	3.2 Student cannot calculate confidence interval for a population parameter for single sample and two samples.	3.2 Student can calculate some confidence interval for a population parameter for single sample and two samples.	3.2 Student can calculate most confidence interval for a population parameter for single sample and two samples.	3.2 Student can calculate all confidence interval for a population parameter for single sample and two samples.
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

**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:**

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: 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:**

<b>Grade Component</b>	<b>Points</b>
Four Assignments (4*125)	500
Final Exam (Chapters 3-14)	500

**Final grade in the course** is the average from the student’s total score from the sum of (Assignments + 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**

<b>Exam</b>	<b>starts</b>	<b>ends</b>	<b>Chapters Covered</b>
<b>Final Exam (Seven hrs)</b>	<b>5 pm Tuesday, August 11<sup>th</sup>, 2015</b>	<b>Midnight of Tuesday, August 11<sup>th</sup>, 2015</b>	<b>3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14 (as per the 6<sup>th</sup> edition)*</b>

\* the contents of chapters 12, 13 and 14 of the 6<sup>th</sup> ed. are included in chapters 13, 14, and 15, respectively, in the 7<sup>th</sup> ed.

## **NOTE THE FOLLOWING**

1. Feel free to ask questions through **EMAIL** or other online tools, especially the **VIRTUAL OFFICE FORUM OF E-COLLEGE**. I am accessible 24/7 through these channels 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 bi-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 and Chapter Instructions prepared by the Professor 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 at the back of the text).

**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 new edition 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://glencoe.mcgraw-hill.com/sites/0010126585/student_view0/megastat.html)

[http://highered.mcgraw-hill.com/sites/0070000237/student\\_view0/megastat\\_tutorials.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](mailto: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](mailto: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.

<b>Chapter</b>	<b>Designated Homework Problems</b>	<b>Date/Due date</b>	<b>Chapter Goals</b>
<u>Chapter 1</u> Introduction to Business Statistics	Class lectures/handouts/email	July 13-19	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	July 13-19	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>Chapter 3 Descriptive Statistics: Numerical Methods</p>	<p>Class lectures/handouts/email</p>	<p>July 13-19</p>	<ol style="list-style-type: none"> <li>1. Define the mean, mode, and median.</li> <li>2. Explain the characteristics of the mean, mode, and median.</li> <li>3. Calculate the mean, mode and median for both grouped and ungrouped data.</li> <li>4. Define the range, mean deviation, variance, and the standard deviation.</li> <li>5. Explain the characteristics of the range, mean deviation, variance, and the standard deviation.</li> <li>6. Calculate the range, mean deviation, variance, and the standard deviation for grouped and ungrouped data.</li> <li>7. Define Skewness</li> <li>8. Define and calculate the coefficient of variation.</li> </ol>
<p><b>Home Assignment 1 (Chapters 1, 2 and 3)</b></p>	<p><b>Emailed to class</b></p>	<p><b>Sunday, July 19<sup>th</sup>, 2015 by 11:59 pm (email attachment)</b></p>	

<p>Chapter 4 Probability</p>	<p>Class lectures/handouts/email</p>	<p>July 20-26</p>	<ol style="list-style-type: none"> <li>1. Define probability.</li> <li>2. Define marginal, conditional, and joint probabilities.</li> <li>3. Use the special and general rules of multiplication and addition in probability computation.</li> <li>4. Calculate marginal, conditional, and joint probabilities.</li> <li>5. Work Problems in Bayesian Probabilities (Handout provided- also mentioned in Ch 19 of the book)</li> </ol>
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<p>Chapter 5 Discrete Random Variables</p>	<p>Class lectures/handouts/email</p>	<p>July 20-26</p>	<ol style="list-style-type: none"> <li>1. Define probability distribution and random variable.</li> <li>2. Differentiate between a discrete and a continuous variable.</li> <li>3 Calculate the mean, variance, and standard deviation of a discrete distribution.</li> <li>4. Describe the characteristics and compute probabilities using the binomial probability distribution – use of tables.</li> <li>5. Calculate the mean variance and standard deviation of a binomial distribution.</li> <li>6. Describe the characteristics and compute probabilities using the Poisson distribution – use of tables.</li> </ol>
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Chapter 6 Continuous Random Variables	Class lectures/handouts/email	July 20-26	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.
<b>Home Assignment 2 (Chapters 4, 5, 6)</b>	<b>Emailed to class</b>	<b>Sunday, July 26<sup>th</sup>, 2015 by 11:59 pm (email attachment)</b>	
Chapter 7 Sampling Distributions	Class lectures/handouts/email	July 27-August 2 <sup>nd</sup>	1. Describe various sampling techniques. 2. Explain the Central Limit Theorem. 3. Explain sampling error. 4. Describe the sampling distribution of means. 5. Define, calculate and use the standard error of the mean.

<p><u>Chapter 8</u> Confidence Intervals</p>	<p>Class lectures/handouts/email</p>	<p>July 27-August 2<sup>nd</sup></p>	<ol style="list-style-type: none"> <li>1. Calculate confidence intervals for sample means and sample proportions.</li> <li>2. Describe the characteristics of Student's t distribution.</li> <li>3. Use the Student's t probability table to calculate confidence interval</li> </ol>
<p><u>Chapter 9</u> Hypothesis Testing</p>	<p>Class lectures/handouts/email</p>	<p>July 27-August 2<sup>nd</sup></p>	<ol style="list-style-type: none"> <li>1. Identify Type I and Type II errors.</li> <li>2. Conduct hypothesis test about population mean and proportion.</li> <li>3. Conduct hypothesis test using one and two tail tests.</li> <li>4. Conduct hypothesis test regarding one population mean with a small sample.</li> </ol>
<p><u>Chapter 10</u> Statistical Inferences Based on Two Samples</p>	<p>Class lectures/handouts/email</p>	<p>July 27-August 2<sup>nd</sup></p>	<ol style="list-style-type: none"> <li>1. Conduct a test of hypothesis about the difference between two population means involving large and small sample sizes and two population</li> </ol>

			<p>proportions.</p> <p>2. Conduct the test of hypothesis regarding the difference in means of two independent samples.</p>
<p><b>Home Assignment 3 (Chaps. 7, 8, 9 &amp; 10)</b></p>	<p><b>Email to class</b></p>	<p><b>Sunday, August 2<sup>nd</sup>, 2015 by 11:59 pm (email attachment)</b></p>	
<p>Chapter 12 (6<sup>th</sup> ed.) or 13 (7<sup>th</sup> ed.)</p> <p>Chi-square Tests</p>	<p>Class lectures/handouts/email</p>	<p>August 3- 9</p>	<p>1. Understand the <math>\chi^2</math> goodness-of-fit test.</p> <p>2. Analyze data by using the <math>\chi^2</math> test of independence.</p> <p>3. Perform <math>\chi^2</math> test on Contingency Tables</p>
<p>Chapter 13 (6<sup>th</sup> ed.) or 14 (7<sup>th</sup> ed.)</p> <p>Simple Linear Regression Analysis</p>	<p>Class lectures/handouts/email</p>	<p>August 3- 9</p>	<p>1. Describe the relationship between independent and dependent variables.</p> <p>2. Calculate and interpret coefficient of correlation, coefficient of determination and the standard error of the estimate.</p> <p>3. Calculate the least squares regression line and interpret the slope and intercept values.</p>

			<p>4. Test the slope of the line for statistical significance.</p> <p>5. Construct and interpret a confidence interval and prediction interval for the mean and an individual value of the dependent variable.</p>
<p><u>Chapter</u> 14 Multiple Regression (6<sup>th</sup> ed.) or 15 (7<sup>th</sup> ed.)</p>	<p>Class lectures/handouts/email</p>	<p>August 3- 9</p>	<p>1. Describe the relationship between two or more independent variables and the dependent variable using a multiple regression equation.</p> <p>2. Compute and interpret the multiple standard error of the estimate and the coefficient of determination.</p> <p>3. Conduct hypothesis tests to determine significance of regression coefficients</p> <p>4. Perform ANOVA and F-Test</p>
<p><b>Home Assignment 4 (Chapters</b></p>	<p><b>Emailed to class</b></p>	<p><b>Sunday, August 9<sup>th</sup>, 2015 by 11:59 pm (email</b></p>	

<b>12, 13 &amp; 14)</b>		<b>attachment)</b>	
<b>Final Exam :Time limit 7 hours: once you start the Test (Single Take Exam)</b>	<b>Chaps. 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, &amp; 14 (6<sup>th</sup> ed.) or 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, &amp; 15 (7<sup>th</sup> ed.)</b>	<b>5 pm Tuesday, August 11<sup>th</sup> – Midnight of Tuesday, August 11<sup>th</sup>, 2015</b>	