

**TENTATIVE SYLLABUS - BA 578**  
**Statistical Methods**  
**Summer II 2015**  
**(Meets 7/13/2015 through 8/13/2015)**

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**REQUIRED TEXT:** Statistics Classnotes by Economics and Finance Department (Available in the university bookstores).

**PowerPoint:** In order to gain more understanding in the class note book, all of you **must go through the PowerPoint of each chapter thoroughly**. See course-home in eCollege for more information.

**Recommended but NOT REQUIRED Text:**

Anderson, Sweeney & Williams, Statistics for Business and Economics. Seventh or higher edition, ISBN: 0-538-87593-3, South-Western College Publishing.

**IMPORTANT NOTICE**

**\*\*\*Net Profit from the sales of classnotes is used to fund the department's scholarships or excellence awards. Since 1994, we have given over 215 scholarships from this fund.**

**\*\*\* Note that this is a tentative syllabus meaning that I can change (a) certain dates for the exams and (b) certain topics to be covered.**

**\*\*\* Since this is a graduate statistics course, I will constantly assume that students have mastered undergraduate statistics work. My classnote covers the most relevant materials, so a student may refer to other texts, if necessary. However, I believe that a student can make an "A" using only the classnote book.**

**\*\*\* If you have not taken any statistics course in the last two years, my suggestion is that you borrow a statistics book from the nearest library to aid your understanding of my classnotes or take the first pre course BA 501. However, I will focus on the classnotes in teaching the class.**

**\*\*\* Also, note that I do not return your graded paper, but upon request I will be able to tell you what you missed on a test via e-mail. (Request period is 2 days after receiving exam grade)**

**\*\*\* Although you have your classnote book as well as other books, available in the library, you are not permitted to copy from your textbook due to copyright protection for author and publishers.**

**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.

**Course Prerequisite:** BA 501 or acceptable undergraduate course in statistics.

**Course Objectives:** The objective of this course is to provide a foundation for the graduate business student on basic principles of statistics to include measurements of location and dispersion, probability, probability distributions, sampling, estimation, hypothesis testing, regression and correlation analysis, and multiple regression. The following are specific objectives for the course that the student will:

- 1) Learn how to calculate and apply measures of location and measures of dispersion -- grouped and ungrouped data cases.
- 2) Learn how to apply discrete and continuous probability distributions to various 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.
- 4) Learn 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
  - 5.2 Be able to compute and interpret the results of Multivariate Regression.
  - 5.3 Be able to compute and interpret Correlation Analysis
  - 5.4 Be able to perform ANOVA and F-test.
  - 5.5 Be able to understand both the meaning and applicability of a dummy variable.
  - 5.6 Be able to understand the assumptions which underline a regression model.
  - 5.7 Be able to perform a multiple regression using computer software.

\*\*\*For more details concerning the above course objectives, see the last page.

**Services for 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 Disability Resources and Services  
Texas A&M University-Commerce  
Halladay Student Services Building  
Room 303 A/D  
Telephone: (903) 886-5150 or (903) 886-5835 FAX: (903) 468-8148

## **Grading Policy:**

### **Grade Component**

|                           |     |
|---------------------------|-----|
| Mid-term Exam             | 30% |
| Final Exam                | 50% |
| Journal Article & Project | 20% |

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

**Classroom Demeanor:** “All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment.” See Student’s Guide Book.

**Academic Integrity:** Academic integrity is the pursuit of scholarly free from fraud and deception and is an educational objective of this institution. Academic dishonesty included, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Students involved in academic dishonesty will fail the course.

## **NOTE THE FOLLOWING**

1. 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 class note books and, depending on class progress, certain topics may be omitted.
2. Homework problems will be recommended on a regular basis.
3. Missed examination: A missed examination will be considered as ‘F’.

## **EXAMS SCHEDULE:**

| <b>Exams</b>  | <b>Exams Uploaded on</b> | <b>Due Date</b> | <b>Chapters Covered</b> |
|---------------|--------------------------|-----------------|-------------------------|
| Mid-term Exam | July 24, 2015            | July 27, 2015   | 2, 3, 4, 5,6,7          |
| Final Exam    | August 7, 2015           | August 10, 2015 | Comprehensive           |

## **JOURNAL PROJECT:**

The information about the project will be communicated to the class before it is uploaded.

| <b>Uploaded on</b> | <b>Due Date</b> |
|--------------------|-----------------|
| July 27, 2015      | August 7, 2015  |

**Rubric:**

| <b>Criteria</b><br>(Course Objectives)   | <b>1 (Unsatisfactory)</b>  | <b>2 (Emerging)</b>  | <b>3 (Proficient)</b>   | <b>4(Exemplary)</b>   |
|--|--|--|---|---|
| 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 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:<br><br>3.1 Be able to perform Test of Hypothesis<br><br>3.2 calculate confidence interval for a population parameter for single sample and two sample cases.<br><br>3.3 Understand the concept of p-values. | 3.1 Student cannot perform the test of hypothesis<br><br>3.2 Student cannot calculate confidence interval for a population parameter for single sample and two sample cases.<br><br>3.3 Student doesn't understand the concept of p-value. | 3.1 Student can perform some test of hypothesis<br><br>3.2 Student can calculate some confidence interval for a population parameter for single sample and two sample cases.<br><br>3.3 Student understands some part of the concept of p-value. | 3.1 Student can perform most test of Hypothesis<br><br>3.2 Student can calculate most confidence interval for a population parameter for single sample and two sample cases.<br><br>3.3 Student understands most part of the concept of p-values. | 3.1 Student can perform all test of Hypothesis<br><br>3.2 Student can calculate all confidence interval for a population parameter for single sample and two sample cases.<br><br>3.3 Student understands the entire concept of p-values. |

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| <p>4) Learn non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.</p>  | <p>4) Student doesn't know non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.</p>  | <p>4) Student knows some parts of non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.</p>  | <p>4) Student knows most parts of non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.</p>   | <p>4) Student knows all parts of non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.</p>   |
| <p>5) Understand regression analysis:<br/> 5.1 Be able to compute and interpret the results of Bivariate Regression<br/><br/> 5.2 Be able to compute and interpret the results of Multivariate Regression.<br/><br/> 5.3 Be able to compute and interpret Correlation Analysis<br/><br/> 5.4 Be able to perform ANOVA and F-test.</p> | <p>5.1 Student cannot compute and interpret the results of Bivariate Regression<br/><br/> 5.2 Student cannot compute and interpret the results of Multivariate Regression<br/><br/> 5.3 Student cannot compute and interpret Correlation Analysis<br/><br/> 5.4 Student cannot solve any questions regarding ANOVA and F-test.</p> | <p>5.1 Student can compute and interpret some of the results of Bivariate Regression<br/><br/> 5.2 Student can compute and interpret some of results of Multivariate Regression<br/><br/> 5.3 Student can compute and interpret some parts of Correlation Analysis<br/><br/> 5.4 Student can solve easy questions regarding ANOVA and F-test.</p> | <p>5.1 Student can compute and interpret most of the results of Bivariate Regression<br/><br/> 5.2 Student can compute and interpret most of results of Multivariate Regression<br/><br/> 5.3 Student can compute and interpret most parts of Correlation Analysis<br/><br/> 5.4 Student can solve medium-hard questions regarding ANOVA and F-test.</p> | <p>5.1 Student can compute and interpret all of the results of Bivariate Regression<br/><br/> 5.2 Student can compute and interpret all of results of Multivariate Regression<br/><br/> 5.3 Student can compute and interpret all parts of Correlation Analysis<br/><br/> 5.4 Student can solve difficult questions regarding ANOVA and F-test.</p> |

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| <p>5.5 Be able to understand both the meaning and applicability of a dummy variable.</p> | <p>5.5 Student cannot apply the dummy variable to solve any questions.</p>                | <p>5.5 Student cannot apply the dummy variable to solve some questions.</p>                            | <p>5.5 Student cannot apply the dummy variable to solve most questions.</p>                                   | <p>5.5 Student cannot apply the dummy variable to solve all the questions.</p>                              |
| <p>5.6 Be able to understand the assumptions which underline a regression model.</p>     | <p>5.6 Student doesn't understand the assumptions which underline a regression model.</p> | <p>5.6 Student understands some parts of the assumptions which underline a regression model.</p>       | <p>5.6 Student understands most parts of the assumptions which underline a regression model.</p>              | <p>5.6 Student understands all parts of the assumptions which underline a regression model.</p>             |
| <p>5.7 Be able to perform a multiple regression using computer software.</p>             | <p>5.7 Student is unable to perform a multiple regression using computer software.</p>    | <p>5.7 Student is able to perform a multiple regression using computer software for easy questions</p> | <p>5.7 Student is able to perform a multiple regression using computer software for medium-hard questions</p> | <p>5.7 Student is able to perform a multiple regression using computer software for difficult questions</p> |

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| <u>Chapter</u>  | <u>Suggested Problems</u>  | <u>Objective</u>  |
|---|--|---|
| <p><b>Chapter 1</b><br/><b>A First Look at Statistics</b></p> |  | <ul style="list-style-type: none"> <li>✓ Define descriptive and inferential statistics.</li> <li>✓ Differentiate between a quantitative and a qualitative variable.</li> <li>✓ Differentiate between a discrete and a continuous variable.</li> <li>✓ Know the four levels of measurement – nominal, ordinal, interval, and ratio.</li> </ul>   |
| <p><b>Chapter 2</b><br/><b>Ungrouped Data</b></p>             | <p>2-9(2), 2-10(3), 2-11(4),<br/>2-13(8), 2-18(3), 2-22(3),<br/>2-31(2), 2-33(3), 2-35(5)</p>      | <ul style="list-style-type: none"> <li>✓ Construct a frequency distribution and define mean, mode and median.</li> <li>✓ Define and calculate percentile and percentile Rank.</li> <li>✓ Measure variability for ungrouped data.</li> </ul>   |
| <p><b>Chapter 3</b><br/><b>Grouped Data</b></p>               | <p>3-6(3)<br/>3-7(1)<br/>3-18(1)<br/>3-22(5)<br/>3-26(1-2)<br/>3-40(1)<br/>3-41(1)<br/>3-54(2)</p> | <ul style="list-style-type: none"> <li>✓ Construct a frequency distribution.</li> <li>✓ Determine and compute relative frequencies, and distribution cumulative frequencies of a frequency.</li> <li>✓ Differentiate between GAP in class and Non-GAP in class of a frequency distribution.</li> <li>✓ Measure central tendency.</li> <li>✓ Measure variability for grouped data.</li> <li>✓ Define and calculate percentile and percentile Rank.</li> <li>✓ Understand and calculate Chebychef theorem.</li> </ul> |

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| <p align="center"><b>Chapter 4</b><br/><b>The Statistical Sampling Study</b><br/><b>(Simple Regression)</b></p> | <p>4-11(4-5)</p>  | <ul style="list-style-type: none"> <li>✓ Understand why we use sample instead of population</li> <li>✓ Understand, interpret and calculate regression analysis.</li> </ul>   |
| <p align="center"><b>Chapter 5</b><br/><b>Probability</b></p>   | <p>5-14(14), 5-16(23),<br/>5-17(27), 5-20(36)</p>   | <ul style="list-style-type: none"> <li>✓ Define probability.</li> <li>✓ Define marginal, conditional, and joint probabilities.</li> <li>✓ Use the special and general rules of multiplication and addition in probability computation.</li> <li>✓ Calculate marginal, conditional, and joint probabilities.</li> </ul>   |
| <p align="center"><b>Chapter 6</b><br/><b>Discrete Probability Distribution</b></p>                             | <p>6-14(1), 6-16(4),<br/>6-28(1)</p>  | <ul style="list-style-type: none"> <li>✓ Describe the characteristics and compute probabilities using the binomial probability distribution both use of binomial Formula and use of tables.</li> <li>✓ Define probability distribution and random variable.</li> <li>✓ Calculate the mean, variance, and standard deviation of a discrete distribution.</li> <li>✓ Define and compute Hypergeometric Distribution</li> </ul> |
| <p align="center"><b>Chapter 7</b><br/><b>The Normal Distribution</b></p>                                       | <p>7-23(6-7),<br/>7-24(11),<br/>7-25(23),<br/>7-26(31), 7-46(2),<br/>7-47(8),<br/>7-48(14),<br/>7-49(17,20),<br/>7-50(26),<br/>7-68(2),<br/>7-69(7)</p> | <ul style="list-style-type: none"> <li>✓ Describe the characteristics and compute standard normal distribution by using formula and normal curve table.</li> <li>✓ Describe the characteristics and compute normal approximation to the Binomial distribution.</li> <li>✓ Differentiate between standard normal distribution and normal approximations to the Binomial distribution.</li> </ul>                              |



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|   |  | <ul style="list-style-type: none"> <li>✓ Describe various sampling techniques.</li> <li>✓ Explain the Central Limit Theorem.</li> <li>✓ Describe interval estimate and the confidence level.</li> <li>✓ Define and compute interval estimates of mean.</li> <li>✓ Define and compute estimates of the population proportion</li> <li>✓ Identify Type I and Type II errors.</li> <li>✓ Conduct a test of hypothesis about a population mean and a population proportion.</li> <li>✓ Conduct the test of hypothesis using one and two tail tests.</li> <li>✓ Conduct the test of hypothesis regarding one population mean with a small sample.</li> <li>✓ Define and compute hypothesis testing for comparing two means.</li> </ul> |
| <b>Chapter 8<br/>Statistical Estimation</b> | 8-11(11)   | <ul style="list-style-type: none"> <li>✓ Describe interval estimate and the confidence level.</li> <li>✓ Define and compute interval estimates of mean.</li> <li>✓ Define and compute estimates of the population proportion</li> </ul>   |
| <b>Chapter 9<br/>Hypothesis Testing</b>     | 9-18(3), 9-19(8),<br>9-20(14)<br><br>Exercises (1-59) on page 9-50 – 9-55. | <ul style="list-style-type: none"> <li>✓ Identify Type I and Type II errors.</li> <li>✓ Conduct a test of hypothesis about a population mean and a population proportion.</li> </ul>  |

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|   |  | <ul style="list-style-type: none"> <li>✓ Conduct the test of hypothesis using one and two tail tests.</li> <li>✓ Conduct the test of hypothesis regarding one population mean with a small sample.</li> <li>✓ Define and compute hypothesis testing for comparing two means.</li> </ul>  |
| <b>Chapter 10</b><br><b>Simple Regression</b>       | 10-24(1),<br>10-26(3),<br>10-31 (1),<br>10-34(9),<br>10-35(11),<br>10-36(13) | <ul style="list-style-type: none"> <li>✓ Understand the differences between various experiment designs and when to use them.</li> <li>✓ Compute and interpret the results of ANOVA.</li> <li>✓ Compute the growth rate.</li> <li>✓ Define whether the regression equation makes sense.</li> </ul>  |
| <b>Chapter 11</b><br><b>Multiple Regression</b>     | 11-9(1)  | <ul style="list-style-type: none"> <li>✓ Understand linear regression model.</li> <li>✓ Describe the relationship between two or more independent variables and the dependent variable using a multiple regression equation.</li> <li>✓ Compute and interpret the multiple standard error of the estimate and the coefficient of determination.</li> </ul> |
| <b>Chapter 12</b><br><b>Time-Series Forecasting</b> |  | <ul style="list-style-type: none"> <li>✓ Understand the factor influencing time series data.</li> <li>✓ Define and compute the classical multiplicative time-series model.</li> <li>✓ Describe the characteristics and compute the using of smoothing method is forecasting.</li> <li>✓ Define and compute linear trend.</li> </ul>                        |

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|   |                              | <ul style="list-style-type: none"> <li>✓ Describe the characteristics and compute autoregressive modeling for fitting and forecasting.</li> </ul>  |
| <p align="center"><b>Chapter 13</b><br/><b>Co integration and Error-Correction Modeling</b></p> |                              | <ul style="list-style-type: none"> <li>✓ Understand the nature of cointegration and be able to derive cointegrating equation through error correction modeling.</li> <li>✓ Differentiate between stationary time series and non-stationary time series.</li> </ul> |
| <p align="center"><b>Chapter 14</b><br/><b>Analysis of Variance</b></p>                         | 14-10(1), 14-11(2), 14-12(3) | <ul style="list-style-type: none"> <li>✓ Define and analyze variance.</li> <li>✓ Understand regression approach to ANOVA</li> </ul>  |
| <p align="center"><b>Chapter 15</b><br/><b>Chi-Square Tests</b></p>                             | 15-8(1), 15-9(2), 15-10(3)   | <ul style="list-style-type: none"> <li>✓ Understand and interpret interaction.</li> <li>✓ Understand the chi-square goodness-of-fit test and how to use it.</li> <li>✓ Analyze data by using the chi-square test of independence.</li> </ul>                       |
| <p align="center"><b>Chapter 16</b><br/><b>Proportions</b></p>                                  |                              | <ul style="list-style-type: none"> <li>✓ Define and compute test for differences between proportions for large samples sizes.</li> <li>✓ Define and compute test for differences between proportions of a multinomial population</li> </ul>                        |