ECON 2843: Elementary Business Statistics
Spring 2019

Instructor: Dr. Alexander Holmes
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Phone: (405) 325-6333
Office Hours: Monday & Wednesday, 10:30-11:30 and by appointment
Action Center: Appointments can be made at http://tutor.ou.edu

Course Meeting Time and Location:
Lectures: online
Labs (OU Students for credit only): Tuesday 3:00-4:15 and Thursday 3:00-4:15 DALE HALL ROOM 128

Teaching assistant office hours:
Cheng Ma
ma0000@ou.edu
Office hours: Tuesday & Thursday, 4:30-5:30
#335 Cate Center 1

Course Prerequisite:
A grade of C or better in math 1503 or a score on the math placement test that would allow admission into math 1523 or math 1723.

Course Delivery:
Blended (OU Students for credit only)

Course Description:
Elementary Business Statistics is the first level statistics class required for all Business and Economics majors and can be used to satisfy the statistics requirement in other departments if you are enrolled as a for-credit OU-student. It is designed as an introductory course to statistics theory and methodology. The foundation of statistical inference is first developed through coverage of descriptive statistics and then close coverage of probability theory and probability density functions: specifically, the hypergeometric, binomial, Poisson, geometric, exponential, uniform, and normal distributions. The leap from probability theory to actual inferential statistics by way of the Central Limit Theorem is accomplished with the use of a gaming model in which students actively participate to solve a constrained goal that requires an understanding of the link between the Central Limit Theorem and the sample size. Confidence intervals and hypothesis testing follow with careful development of both the theory and philosophy of the hypothesis test. Specific hypotheses are covered including tests for means, proportions, variances, differences in means, and differences in proportions. Finally, correlations and regression are covered in detail. The foundation of regression, known as the OLS model, is developed and students will be able to propose and test various hypotheses concerning a causal relationship assumed to be linear. Students will write a brief paper demonstrating their knowledge of regression analysis with a practical application of their own
design. For-credit Oklahoma University students will have the opportunity to interact with face-to-face teaching assistants once per week in regularly scheduled lab classes.

**Course Goals:**
By the end of this course, the student should be able to:

- Recognize and differentiate between key terms.
- Apply various types of sampling methods to data collection.
- Recognize, interpret, and create a variety of different types of graphs, diagrams, and tables.
- Recognize, interpret, and calculate distributions, probabilities, and expected values.
- Apply concepts like Central Limit Theorem, Confidence Intervals, Hypothesis Testing, as well as Linear Regression and Correlation.

**Course Material:**
This course will utilize an adapted version of the free OpenStax textbook “Introduction to Statistics” and can be downloaded from a link on Dr. Holmes’ webpage accessed through the Economics Department webpage. The textbook is also free online through Canvas.

**Assessment:**

**Grading Policy (OU Students for credit only):** There will be two 75 minutes exams in the lab session during the semester and a comprehensive final exam. The two 75 minutes exams are worth 100 points each and the comprehensive final is worth 200 points. Another 100 points is determined by performance in the lab session. There are 4 lab quizzes. Each of the 4 quizzes is worth 20 points. The quizzes will be administered during lab session. If a student knows in advance that a quiz will be missed, then a prior arrangement must be made with the lab instructor to take the quiz early or late in another lab session. There is also a required regression paper project worth 100 points. This paper is due Friday May 3, 2019. See below for more information on this project.

<table>
<thead>
<tr>
<th>Possible Points</th>
<th>Grading Scale</th>
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<tbody>
<tr>
<td><strong>Exam 1</strong> 100 points (10%)</td>
<td><strong>A</strong> 90-100 %</td>
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<tr>
<td><strong>Exam 2</strong> 100 points (15%)</td>
<td><strong>B</strong> 80-89 %</td>
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<tr>
<td><strong>Lab Grade</strong> 100 points (30%)</td>
<td><strong>C</strong> 70-79 %</td>
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<tr>
<td><strong>Regression paper project</strong> 100 points (15%)</td>
<td><strong>D</strong> 60-69 %</td>
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<tr>
<td><strong>Comprehensive Final Exam</strong> 200 points (30%)</td>
<td><strong>F</strong> Below 60</td>
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<tr>
<td><strong>Total Points</strong> 600 points</td>
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The quizzes, two hourly exams and the final exam consist primarily of statistical problems. A calculator will be necessary for performing mathematical computations, BUT not for programming equations. Examinations will be closed book and closed notes. All relevant formulas will be provided for the examinations. Statistical tables also will be provided.

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1 There will be 4 quizzes worth 80% of your lab grade and the remaining 20% will be allocated to class participation and attendance.
Additional Support for Learning:

Action Tutoring, Action Center. Information about the Action Tutoring program can be found at the University College website including location and time of tutoring sessions.

Course Policies:

Make-up Policy (OU students for credit only). There will be no make-up exams and quizzes. If a quiz is missed (given that the absence is a University excused absence), the other quizzes’ grades will be re-weighted. If an exam is missed for any reason (given that the absence is a University excused absence), the final exam will be re-weighted. (But, this will only be done for one midterm, and your instructor must be notified promptly, and then determine whether permission will be granted.) Failure to take the final examination will automatically result in a course grade of F unless there are unavoidable exceptional circumstances.

Drop Policy (OU students for credit only). You will be allowed to drop the course with a passing grade regardless of performance until April 12. Dropping the class after April 12 requires permission of the Office of the Dean.

Special Note:

Any student who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible to make necessary accommodations.

Academic Integrity:

Cheating is strictly prohibited at the University of Oklahoma, because it devalues the degree you are working hard to get. As a member of the OU community it is your responsibility to protect your educational investment by knowing and following the rules. For specific definitions on what constitutes cheating, review the Student’s Guide to Academic Integrity at http://integrity.ou.edu/students_guide.html. Be aware that it is my professional obligation to report academic misconduct, which I will not hesitate to do. Sanctions for academic misconduct can include expulsion from the University. I will impose a grade penalty of an F in this course for any infractions, so don’t cheat. It’s simply not worth it.

Tentative Schedule (OU Students for credit only):

**Hourly mid-term exams**

- Exam #1 Tuesday February 26th Chapters 1-6
- Exam #2 Tuesday April 9th Chapters 7-10

**Homework**

Done for no credit; due prior to the day the topic is discussed.

The lab session’s purpose is to go over the homework and explain the concepts through examples.

**Quizzes**

Given in lab on the following dates:
Week #4 (Chapters 1-3) February 5/7
Week #6 (Chapters 4-5) February 19/21
Week #12 (Chapters 7-9) April 2/4
Week #15 (Chapters 11-12) April 23/25

Three to four questions per quiz, approximately 20 minutes time in lab class to do the work.

**Regression Paper Project**

Due as electronic copy on Friday May 3rd, 2019 on canvas. This paper is designed to apply the ordinary least squares regression model to a question of your design. Your model must have at least two independent variables and 25 observations. As the semester develops a more detailed set of instructions will be provided and discussed in the discussion session. The Paper is discussed at length on Canvas with a video specifically for how to run a regression on Excel. In addition, copies of papers by previous students are available on Canvas. For review, to answer your burning question: the paper is expected to be your own independent work and be between 6 and 10 pages in length and does require the use of the Excel regression package.

**PAPER DUE MAY 3rd, 2019 BY 5:00 p.m.**

**Comprehensive Final Exam**

Wednesday, May 8th, 2019 10:30 AM -12:30 PM
Nielsen Hall 170
Regression Project Outline

The goal of the required regression paper is to familiarize you with the statistical software often used in regression analysis, Microsoft Excel, and to sharpen your analytical skills along with the creative act of developing and testing a model. Just what you decide is the relationship you desire to test is not significant, BUT it must stand up to the standard that it makes sense that your dependent variable is reasonably dependent upon your independent variables. You are required to make such a statement in your paper and are expected to defend it.

Your model is required to have at least 2 independent variables and 30 observations. The data are to be actual data not some hypothetical data you manufacture. You may, however, develop a survey and use those data, but be advised that developing surveys is a whole statistical paper in itself.

This paper will be graded on both its demonstrated analytical skills and writing ability. It is expected that this paper could be completed in less than 6-10 pages. Do not include your data, but you must provide the citation as to its source so we can retrieve it if desired. You may present your results in the format of the Excel output. These results are NOT self-explanatory! You are to tell the reader what you found and what conclusion you draw from your work.

To help, the outline below is provided:

1. Provide a clear TOPIC with rational reasoning for choosing said topic.
   a. Construct a null and alternative hypotheses for each of your independent variables
   b. Explain briefly what you are trying to determine/prove

2. DATA collection
   a. Include a summary of your data in the paper. (Descriptive statistics)
   b. Provide the source of your data with an appropriate citation.
   c. Outline expected outcomes before analyzing results.

3. Build a MODEL
   a. Use regression on Microsoft Excel to build a linear model.
   b. Explain briefly your interpretation of the slope, the correlation coefficient, and the coefficient of determination as it relates to your data

4. Analyze your results
   a. Explain your model in detail.
   b. Run a hypothesis test on the coefficients of each variable.
   c. Run a hypothesis test on the model as a whole using the F-test method.
   d. Explain the results from both part b and c above in order to make a final determination about the validity of your model.

Do not be too distressed if your model does not perform as your theory suggested it would. Do not be surprised that variables you thought would have positive slopes have negative ones and vice-versa. Sometimes it just works out that way.

Remember, this paper is not expected to forge new frontiers in Economics, or accounting or management, or biology or etc. It is an exercise to get practice with a methodology and a powerful statistical tool.