

Economics and Business Statistics (ECO 391)

University of Kentucky

Spring 2019

Instructor:	Xiaozhou Ding	Time:	MW 4:30-5:45 PM
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Course Pages: Canvas.

Office Hours: Gatton 245B, Monday & Wednesday 2:00 PM-3:30 PM, or by appointment. For any questions, please start the subject line of your email with: 391-your name-subject.

Textbook

Jaggia, Sanjiv and Alison Kelly. *Business Statistics: Communicating with Numbers*, 3rd Edition, McGraw-Hill Irwin, 2019. Alternatively, you may use the 2nd edition (2016), or the 1st edition (2013).

Jaggia and Kelly have written an excellent statistics textbook for business and economics majors. This text along with the class preparation assignments provide a wonderful foundation for our course and will help you master the principles of economic and business statistics.

Prerequisites

STA 296 (Statistical Methods and Motivations) or equivalent.

Course Description

Statistical ideas are part of the language of business. An understanding of statistics will enhance your value as a manager or executive. Many of the upper division courses in Accounting, Agriculture Economics, Economics, Finance, Management, Marketing, and Public Policy use and build upon the statistical techniques and analysis learned in ECO391. This course provides a survey of statistical techniques relevant to modern economics and business, with major emphasis on estimation, hypothesis testing, correlation, modeling, analysis of variance, regression, and forecasting.

Intended Student Learning Outcomes

We have the following eleven student learning outcomes for the course:

1. Students will be able to choose a topic conducive to regression analysis, specify a regression equation, run descriptive statistics in Excel on the data, run regressions in Excel, interpret and evaluate the results, and write reports detailing the regression project and the results.
2. Students will be able to evaluate regression results, including being able to determine whether the estimated regression coefficients have the expected sign, whether the estimated regression coefficients are statistically significant, whether the equation includes irrelevant variables or omits theoretically relevant variables, whether an alternative functional form should be used, and whether the goodness of fit of the equation appears adequate.
3. Students will be able to distinguish between a controlled experiment and an observation study, and explain why regression analysis is needed with an observational study to estimate the impact of one variable on the dependent variable when multiple variables are changing.

4. Students will be able to calculate in Excel and use in real-world applications the mean, the variance, the covariance, the coefficient of variation, and the correlation coefficient.
5. Students will be able to do analysis of variance (ANOVA). They will be able to run ANOVA in Excel and interpret the ANOVA output. They will be able to compare and contrast regression analysis and analysis of variance, and will be able to distinguish between within-sample and between-sample variation.
6. Students will be able to explain the meaning of the sampling distribution of an estimator.
7. Students will be able to do hypothesis testing using either the traditional rejection-region approach or the p-value approach.
8. Students will be able to distinguish between quantitative and qualitative variables and will be able to construct and use dummy variables both intercept dummies and slope dummies.
9. Students will be able to explain multicollinearity and its effect on regression results. Students will be able to choose independent variables that are not redundant and to run using Excel the correlation matrix to calculate pairwise correlations.
10. Students will be able to estimate using Excel a linear probability model, and will be able to interpret the results and use the results for prediction.
11. Students will write and communicate orally using statistics to inform conversation.

Grading Policy

The weight for the course will be as follows:

- First Midterm Exam, 25%
- Second Midterm Exam, 25%
- Final Exam, 25%
- Homework, 12.5%
- In-class Project, 12.5%

I will use the following tentative scale to assign final course grades: 90-100 A, 80-89 B, 70-79 C, 60-69 D, 59 and below E. If I feel that a curve is necessary it will be determined separately for each exam. Exam questions will reflect information and ideas presented in both lectures and assigned readings.

Exams

There are three exams with each worth 100 points. The course material builds upon itself, so each exam will include concepts from previous exams. The exams cover material from class, the text, and any assigned outside readings. The exams will most likely consist of short-answer essay/problem questions but could include some multiple-choice questions. The tentative dates for the exams are:

- Exam I: Wednesday, February 20.
- Exam II: Wednesday, April 3.
- Final Exam: TBA.

Final exam date is set by the University registrar at <http://www.uky.edu/registrar/content/spring-final-exam-schedule>. Bring a calculator to each exam. **Any student missing an exam due to an excused absence must inform me before the exam.** If you miss either exam I or exam II and do not receive an excused absence before the exam, your exam grade will be a zero. For those with excused absences, the make-up exam will be given soon after the missed exam at a common time reasonably convenient to all parties.

In-Class Team Projects

There will be about 3-5 in-class team projects worth 50 points. You will work together in class as a team to do regression analysis, analysis of variance, or some other statistical technique. The reasons for team projects, as opposed to individual projects, are to share the work load, to clarify your understanding through interactions with your team members, and to work together as a team to produce a final product.

I will assign you to a team. The team sizes will be 4 to 5 students. To ensure active participation by all team members, I reserve the right based on my observations and consultation with other team members, to deduct points on any team member who does not actively participate in the in-class projects.

Federal Regulations on Student Participation:

Last spring the University was made aware of federal regulations requiring that student attendance/engagement in classes must be confirmed early in the semester. The Gatton College of Business and Economics requested that the following information be included in the syllabus: In order to meet federal regulations, the instructor will monitor student participation in this class through attendance or assignments. The instructor will assess student engagement at least once during the first three weeks of the semester using an instrument or activity. **Students whose engagement cannot be determined on that date may be dropped from the course.** If you will be missing any class period or will not be submitting an assignment during that period, it is your responsibility to notify the instructor, regardless if the absence or missed assignment is excused or not under University rules.

Class Policies:

- **Being Courteous**
Be on time and if possible do not leave until class is dismissed. Late arrivals and early departures disrupt your fellow students and me. If you have a long walk to get to class, let me know in advance. If nature calls so loudly that you must answer, please leave and return to the classroom quietly.
- **Cell Phones and Laptops**
I expect professional behavior. Silence your cell phones. No texting during class. You can use your laptop to take notes. You cannot use your laptop for instant messaging, e-mailing, playing games, checking sports scores, shopping, and the like during class.
- **Excused Absences**
The University Senate Rule on Excused Absences states that a student is entitled to an excused absence for the following reasons: serious illness; illness or death of family member; University-related trips; and major religious holidays. In each case, appropriate verification may be required. Students missing assignments due to an excused absence bear the responsibility of informing me about their excused absence within one week following the period of the excused absence (except where prior notification is required). I will regularly confirm the authenticity of documentation used to verify excused absences.
- **Grievance Procedure**
Anyone feeling that a dispute exists after the grading of an exam may submit a written

grievance. The grievance should identify the item in dispute and provide arguments supporting the student's position. Grievances must be submitted within two class periods following the return of the exam/assignments.

- Attendance

I will keep track of who is attending class, who is participating in class discussion, and who is making a concerted effort to succeed. I view participation as a way to reward you if I can tell you're trying hard.

Cheating

Academic integrity is valued by the University of Kentucky and its vast majority of students. University policy will be followed for any student caught cheating or plagiarizing and the penalty could include an E in the course and possible suspension or dismissal from UK.

Students with Disabilities or Accommodation Requests

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours or after class. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (DRC) at least two weeks before the first exam. The DRC coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859) 257-2754 and via email at drc@uky.edu. Their web address is <http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/>.

Tentative Course Outline

1. Brief Review of Basic Statistical Ideas
 - (a) Ch.3, "Numerical Descriptive Measures," Sections 3.1, 3.4, & 3.8.
 - (b) Normal distribution: Ch.6, "Continuous Probability Distributions," Sections 6.2.
 - (c) *t*-Distribution: Ch.8, "Interval Estimation," Section 8.2.
2. Statistical Inference
 - (a) Ch.7, "Sampling and Sampling Distributions," Sections 7.1-7.2.
 - (b) Ch.8, "Interval Estimation," Sections 8.1-8.2.
 - (c) Ch.9, "Hypothesis Testing," Sections 9.1-9.3.
 - (d) Ch.10, "Statistical Inference Concerning Two Populations," Sections 10.1-10.2.
3. Regression Analysis
 - (a) Ch.14, "Regression Analysis".
 - (b) Ch.15, "Inference with Regression Models," Sections 15.1, 15.3-15.4.
 - (c) Ch.17, "Regression Models with Dummy Variables".
 - (d) Ch.16, "Regression Models with Nonlinear Relationships," Sections 16.1 & portions of 16.2.
4. Analysis of Variance (ANOVA)
 - (a) Ch.10, Statistical Inference Concerning Two Populations, Sections 10.1-10.2
 - (b) Ch.13, "Analysis of Variance," Sections 13.1 & 13.2.