

**Economics and Business Statistics, ECO 391
Tentative Syllabus**

Hao Guo

Section 009
TR 8:00-9:15 a.m.

Fall 2016
Business & Economics Building Room 235

Office: 245J Business & Economics Building
Office Hours: TR 4:30 p.m. – 5:30 p.m. & by appointment
Questions and comments during class are encouraged and appreciated.
E-mail: hao.guo@uky.edu
Course website: Canvas

Prerequisite: STA 291 (Statistical Methods) or equivalent.

Required Text and Materials

Jaggia, Sanjiv and Alison Kelly. *Business Statistics: Communicating with Numbers*. 2nd edition, McGraw-Hill Irwin, 2015.

Course Description

Many of the upper division courses in Accounting, Agriculture Economics, Analytics, Economics, Finance, Management, Marketing, and Public Policy use and build upon the statistical techniques and analysis learned in ECO 391. This course provides a survey of empirical techniques relevant to modern economics and business, with a major emphasis on regression analysis, estimation, hypothesis testing, correlation, modeling, analysis of variance, and economic forecasting.

Student Learning Outcomes

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

1. Students will be able to do *regression analysis*. They will be able to choose a topic conducive to regression analysis, specify a regression equation, enter data into Excel, run descriptive statistics on the data, run regressions, interpret and evaluate the results, and write a report detailing the regression project and the results.
2. Students will be able to evaluate regression results, determining whether the regression coefficients have the expected sign and magnitude, whether the regression coefficients are statistically significant and economically significant, whether the data set appears adequate, whether the equation includes irrelevant variables or omits theoretically relevant variables, and whether the goodness of fit of the equation appears adequate.

3. Students will be able to do analysis of variance (ANOVA). They will be able to choose a topic conducive to analysis of variance, arrange data in Excel and run ANOVA, and interpret the ANOVA results.
4. Students will be able to distinguish within-sample and between-sample variation in ANOVA, and will be able to compare and contrast ANOVA and regression analysis.
5. 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.
6. Students will be able to explain the sampling distribution of an estimator, and the properties of *unbiasedness* and *efficiency*.
7. Students will be able to use in hypothesis testing 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. They will be able to choose independent variables that are not redundant and to run using Excel the correlation matrix, and explain why pairwise correlations do not necessarily detect multicollinearity.
10. Students will be able to estimate using Excel a linear probability model, and be able to interpret the results.
11. Students will write and communicate orally using statistics to inform conversation.

Teaching Philosophy and Methods

I love teaching and look forward to interacting with you throughout the semester about economics and business statistics as well as your other interests. Class time will be a combination of lecture and active learning. Lecture will be used to motivate, clarify, extend, and synthesize the material. PowerPoint slides will be provided as an **outline** for notes. Active learning will be used to involve you in a discussion of the econometric principles and ideas.

Our textbook authors explain the statistical concepts in relatively simple terms with an emphasis on business and economic applications. With the in-class assignments, you can get the basics from the text with thoughtful reading.

In class, we will work together on the more demanding part of the course — analyzing, applying, synthesizing, and evaluating statistical ideas. **Regularly, you will work together in class with your classmates.** I will ask you to compare answers to a problem or work together on a question with your neighbor or neighbors. Working together in class will increase learning potential and retention. Learning is not a spectator sport: Maximum learning results from maximum involvement.

Evaluation Criterion

Your class grade is out of 450 points. As assignments and exams are completed, your grade will be posted online. Your final grade for the course is based on the distribution in Table 1.

Table 1

Task	Points	Percentage of Grade
Problems/Quizzes (5 pts each)	50	11.2%
Overall Project Grade	100	22.2%
Exam I: Statistical Review	100	22.2%
Exam II	100	22.2%
Final Exam	100	22.2%
Total	450	100%

Table 2 shows the total points you need for each letter grade.

Table 2

Grade	Total Points	Grade Percentage
A	403-450	90-100%
B	358-402	80-89%
C	313-357	70-79%
D	268-312	60-69%
E	Less than 268	Below 60%

Quizzes and Assignments

These daily assignments are not traditional quizzes. Most will be in-class worksheets done as I progress through the lecture or group assignments. I will aim for around 10-12 of these throughout the term and will drop your lowest 1-2 scores. These assignments **cannot be made up** further emphasizing the importance of class attendance.

Exams

There are three exams. All exams will be worth 100 points. The Final Exam is comprehensive, with an emphasis on the material since Exam II. The exams cover material from class, the text, and any

additional assigned readings. The course material builds upon itself, so each exam will include concepts from previous exams. If I feel that a curve is necessary, it will be determined separately for each exam.

The dates for the exams are:

Exam I:	Thursday, September 15 th , 2016	8-9:15 a.m.
Exam II:	Thursday, October 27 th , 2016	8-9:15 a.m.
Final Exam:	Wednesday, December 14 th , 2016	8-10:00 a.m.

Non-programmable calculators can be used for exams. In each foreseen absence case, written verification will be required at least one week before the scheduled exam. Permission to miss an exam must be secured before the scheduled exam time unless the cause of the absence is unanticipated. If you miss an exam for an unforeseen reason you should contact me as soon as you are physically able to pick up the phone and call me or email. The make-up exam will be given soon after the missed exam at a time reasonably convenient to all parties. There will be 1 chance to make up the exam, if you miss the agreed upon make up exam, you get a zero. If you miss an exam and do not receive an excused absence, you receive a zero for that exam.

Group Regression Project

The projects allow you to do regression analysis instead of just talking about it. The reasons for group projects, as opposed to individual projects, are to share the workload, clarify your understanding of regression analysis through interactions with your group members, and work together as a team to produce a final product. The group projects are worth 100 points.

I. Assignment to Groups

I will assign you to a group. The group sizes will be 4 to 5 students. Please let me know within the first week if you have a strong personal conflict with anyone in class and would prefer not to work with them. Additionally, I will assign a student to serve as the group leader. (I will only assign someone who is willing to be a group leader.) The group leader's role is to keep the group on task, and to divide the workload among the group members, and make sure that no one is *free riding*.

II. Project Grades

Below I discuss two separate components of the overall project grade: the group project grade and the individual project grade. Your overall project grade, used to calculate your final course grade, will depend on your relative group project grade and individual project grade. See details in the following paragraphs.

Your group project grade will depend on how well your group performs the five parts of the project detailed below. Your individual-contribution grade depends on how much you contribute to your group project. To determine your individual contribution, I will observe you throughout the semester, and at the end of the semester I will ask each group member to evaluate each other group member's contribution. A checklist is provided at the end of the syllabus on what is expected of each group member.

If your individual contribution grade is above B- (82%), your overall project grade will be the simple average of two grades: your group's grade and your individual-contribution grade. For example, if your group's grade is 94% and your individual grade is 90%, then your overall project grade will be 92% $[(94+90)/2=92\%]$.

If you receive a B- (82%) or below on your individual-contribution grade, then your overall project grade will only be your individual-contribution grade. For example, if your group's grade is 94% and your individual-contribution grade is 76%, then your overall project grade will be 76%, not $[(94 + 76)/2 = 85\%]$.

III. Project Parts & Tentative Dates

Your group leader must **email** me each of the following project components by 5:00 p.m. on the due date in .doc or .docx format. I will make comments/suggestions using track changes in word. If you are unfamiliar with how to use track changes, please locate the appropriate resources online or in word help.

A brief description of each part of the project with the respective tentative deadlines and points are detailed below.

i. **Proposal:** 15 points

Select an interesting problem conducive to regression analysis, appropriate for your assignment (not too little or not too grandiose), and with data available. Explain your project, define the variables, and denote data sources.

ii. **Variable Classification, Regression Specification & Data:** 15 points

Specify the regression equation, classify the independent variables as main, marginal, substitutes, and special interests, and provide hard copies of the data.

iii. **Data Analysis:** 20 points

Enter your data into Excel. Calculate, report, and analyze the summary statistics. Analyze the data to check for mistakes and to get a "feel" for your data.

iv. **Regression Results:** 25 points

Do regressions, and estimate parameters. Evaluate and interpret your results, and thoughtfully develop the "best" regression equation.

v. **Presentation, Regression Revisions, Extensions, & Conclusions:** 25 points

Give a 10-15 min presentation to the class. Make needed revisions, consider extensions to the regression equation, interpret your results, and summarize your most interesting findings.

A complete description for each project part will be handed out as we progress through the semester. Each part of the project will be written as a paper and each part builds upon the previous parts. During the last two class periods, each group will give about a ten to fifteen minute presentation of their regression results.

Excused Absences

The University defines the following as excused absences: 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 the instructor about their excused absence within one week following the period of the excused absence (except where prior notification is required).

Grievance Procedure

Anyone feeling that a dispute exists after the grading of an exam or quiz 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 or quiz. Attach your entire exam or quiz to the grievance.

Mid-term Grade

Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (<http://www.uky.edu/registrar/calendar>)

Academic Integrity

Per University policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the University may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <http://www.uky.edu/Ombud>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Senate Rules 6.3.1 (see <http://www.uky.edu/Faculty/Senate/> for the current set of *Senate Rules*) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording, or content from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work (including, but not limited to a published article, a book, a website, a computer code, or a paper from a friend) without clear attribution. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work, which a student submits as his/her own, whoever that other person may be. Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone.

When a student's assignment involves research in outside sources or information, the student must carefully acknowledge exactly what, where, and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content, and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas, which are so generally and freely circulated as to be a part of the public domain.

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations Due to Disability

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). 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/>.

Course Outline

I: Why Regression Analysis?

Freedman, David, Robert Pisani, and Roger Purves. "Chapter 1: Controlled Experiments" and "Chapter 2: Observational Studies," in *Statistics*. New York: W.W. Norton & Company, pp. 3-12 and 21-22.

II: Basic Statistical Ideas (REVIEW)

1. Normal Distribution: Ch. 6, "Continuous Probability Distributions," Sections 6.2 – 6.3
2. Ch. 7, "Sampling and Sampling Distributions," Sections 7.1 and 7.2,
3. Ch. 8, "Estimation," Sections 8.1 – 8.2
4. t-Distribution: Ch. 8, Section 8.3
5. Ch. 9, "Hypothesis Testing" Section 9.1 and 9.2

III: Regression Analysis

1. Ch. 14, "Regression Analysis"
2. Ch. 15, "Inference with Regression Models"
3. Ch. 17, "Regression Models with Dummy Variables" (Selected sections)
4. Ch. 16, "Regression Models with Nonlinear Relationships" (Selected sections)

IV: Analysis of Variance (ANOVA) (If time permitting)

1. Ch. 13, "Analysis of Variance" (Selected sections)

V: Time Series, Forecasting, and Index Numbers (If time permitting)

1. Ch. 18, "Time Series and Forecasting" (Selected sections)
2. Ch. 19, "Returns, Index Numbers, and Inflation" (Selected sections)

This syllabus is subject to change (including exam dates). If I do make changes, I will announce them in class and/or email class members through Blackboard.
