

**Economic and Business Statistics, ECO391**  
**Syllabus, Spring 2019**  
**Monika Islam Khan**

Section 001, MWF 9:00-9:50

BE157

**Prerequisite:** STA296 (Statistical Methods and Motivations) or equivalent

Office: BE 245J

Office Hours: Friday 11:00am-12:30pm, & by appointment.

**Questions and comments during class are encouraged and appreciated.**

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Course Website: Canvas

**Text & Other Readings**

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

**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.

### **Teaching Philosophy & Methods**

I love teaching and look forward to interacting with you throughout the semester about statistical analysis and concerns you might have. I believe in active learning. Learning is not a spectator sport: Maximum learning results from maximum involvement.

In class, we will work together on the more demanding parts of the course – applying, analyzing, and evaluating the statistical ideas. Regularly, you will work together with your classmates during class. I will ask you to compare answers to a problem or work together on a problem.

### **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.

### Grading System

Your grade will be determined by the total number of points you earn on the following:

	<b>Points</b>
Homework & In-Class Activities	50
In-Class Team Projects	50
Exam 1	100
Exam 2	100
Final Exam	100
Total	400

Course grades will be assigned based on the following point ranges:

<b>Course Grade</b>	<b>Points</b>
A	360 - 400
B	320 - 359
C	280 - 319
D	240-279
E	< 239

### 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 dates for the exams are:

- Exam I: Wednesday, February 20  
Exam II: Wednesday, April 3  
Final Exam: Wednesday, May 1 (as per the Registrar)

**The dates for Exams I and II are subject to change, if required.** Bring a calculator to each exam. Make-up exams are given only for excused absences. If you miss an exam and do not receive an excused absence, you receive a zero for that exam. The make-up exam will be given soon after the missed exam and at a common time reasonably convenient to everyone involved.

### **Homework & In-Class Activities**

There will be 5-8 problem sets to be submitted individually in class as homework worth 25 points each; you will have approximately a week's time to finish each. Furthermore, there will be at least one in-class activity every week worth 25 points each; you may be asked to work individually or in groups.

### **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.

### **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.**

### **Cell Phones and Laptops**

Turn your cell phones to vibrate and 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, and the like. I will ask you, if necessary, to turn your laptops around so that we can all see what you are watching.

### **Grievance Procedure**

Anyone feeling that a dispute exists after the grading of an exam or assignment 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 assignment.

### **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](mailto:drc@uky.edu). Their web address is <http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/>.

**Course Outline**  
(Jaggia and Kelly, 3<sup>rd</sup> Edition)

**Brief Review:**

**I: Basic Statistical Ideas**

1. Ch. 3, “Numerical Descriptive Measures,” Sections 3.1, 3.4, & 3.8
2. Normal distribution: Ch. 6, “Continuous Probability Distributions,” Sections 6.2
3. t-Distribution: Ch. 8, “Interval Estimation,” Section 8.2

**II: Statistical Inference**

1. Ch. 7, “Sampling and Sampling Distributions,” Sections 7.1-7.2
2. Ch. 8, “Interval Estimation,” Sections 8.1–8.2
3. Ch. 9, “Hypothesis Testing,” Sections 9.1–9.3

**Main Topics for the Semester:**

**III: Regression Analysis**

1. Ch. 14, “Regression Analysis”
2. Ch. 15, “Inference with Regression Models,” Sections 15.1, 15.3-15.4
3. Ch. 17, “Regression Models with Dummy Variables”
4. Ch. 16, “Regression Models with Nonlinear Relationships,” Sections 16.1 & portions of 16.2

**IV: Analysis of Variance (ANOVA)**

1. Ch. 10, “Statistical Inference Concerning Two Populations,” Sections 10.1-10.2
2. Ch. 13, “Analysis of Variance,” Sections 13.1 & 13.2