Econ 103 - Statistics for Economists

Fall, 2018

Course intructor: Karun Adusumilli

Office: Perelman building, 631

Office hours: Tuesday 2-4pm

Course description: This course will teach you how to learn from data and understand uncertainity using the ideas of probability theory and statistics. After completing this course, you will be able to carry out simple statistical analyses yourself on the computer package R.

Prerequisites: The prerequisite for this course is multivariate calculus (Math 104 followed by 114 or 115). To do well in this course you will need to be comfortable with algebra, manipulating sums, differentiation and partial differentiation, solving unconstrained optimization problems, and integration.

Required Text: The textbook for this course is 'Introductory Statistics for Business and Economics', 4th Edition by Thomas H. and Ronald J. Wonnacott (WW4). This book is old, so cheap used copies are plentiful. While I suggest that you complete the assigned readings, my lecture slides, which will be posted online at the start of each week, are the final authority on course material. In particular, you are not responsible for material in the textbook unless it is also covered in lecture, but you are responsible for material from lecture even if it is not covered in the textbook.

Required Software: We will use the statistical package R via a front-end called RStudio throughout the course. Both R and RStudio are free and open source. Installation instructions appear on the last page of this syllabus. You will be taught to use R through a series of tutorials. Additional R resources are listed on the last page of this syllabus.

Recommended Texts: I will not use these explicitly, but in the past instructors have recommended two supplementary texts for students who feel they may need extra help with the course material. First is the 'Student Workbook to accompany Introductory Statistics for Business and Economics', 4th Edition. Used copies are available on Amazon. The workbook contains fully worked out solutions to all odd-numbered problems from the textbook along with additional practice problems and solutions. If you're having trouble with R and prefer a printed book to the free online resources listed below, I suggest consulting 'The R Student Companion' by Brian Dennis.

Departmental Course Policies: All Economics Department course policies are in force in Econ 103 even if not explicitly listed on this syllabus.

Academic Integrity: All suspected violations of the code of academic integrity as set forth in the Pennbook will be reported to the Office of Student Conduct. Confirmed violations will result in a failing grade for the course. We will check identification cards at exams so please to bring yours.

Piazza: We will be using an online discussion forum called Piazza, accessible via Canvas, for all written communication in this course. We will use Piazza to make course announcements, answer questions about course material and respond to private messages from individual students regarding personal issues. By asking your question and getting an answer on Piazza, you create a positive externality: other students benefit from your questions and you benefit from theirs. You can even post anonymously if you like. The instructor and RIs will actively moderate Piazza both to answer questions and approve (or correct) answers written by your fellow-students. All written communication for Econ 103 should be directed to Piazza, not to the instructors' personal email accounts.

Homework: I will post homework assignments on Piazza each week; apart from the first two weeks. Although homework will neither be collected nor graded, it is crucial that you keep up with the homework on a weekly basis if you hope to do well in the course. Solutions to homework problems will be provided. Be sure to use these responsibly: you gain nothing by merely reading the answers. As an extra incentive to keep up with the homework, one problem from each exam (including midterms and finals) will be taken almost directly, with possibly mild modifications, from your assigned homework for the relevant portion of the course.

Grading and Assignments

Grades for this course will be determined based on 7 in-class quizzes, two in-class midterms, and a comprehensive final examination that will take place during the exam period.

Specifically,

$$\text{Overall score} = (20\times\text{Quizes}) + (20 \times \text{midterm 1}) + (20 \times \text{midterm 2}) + (40 \times \text{Final}).$$

Course Curve: We typically try to target an average GPA in the range between 3.0 and 3.2, or slightly above a B average. In a nutshell, I will give about 30 percent As and A-s, 40-50 percent Bs and 20 to 30 percent Cs. If necessary, I will curve overall course scores (not individual assignments) so that they approximately fall into these ranges. I reserve grades below a C-minus for those cases in which a student fails to attain a minimum level of basic

competence in statistics, an absolute rather than relative standard. The grade boundaries are: A-range = 90-100, B-range = 80-89, C-range = 70-79, D-range = 60-69. (In this case, the top two points of each range would be a "plus" and the bottom two points a "minus.")

Quizzes: There will be seven short, in-class quizzes over the course of the semester. Unless otherwise indicated, each quiz will cover the material from the most recent lectures since the last quiz or midterm. When calculating your quiz average, I will drop your two lowest scores and weight the remaining quizzes evenly. There will be no makeup quizzes so be sure to use your two "free skips" carefully. Quizzes will not be returned and answers will not be posted, but your RI will be happy to go over your quiz with you in office hours if you wish.

Exams: There will be two 70-minute in-class midterm exams and a 2-hour final exam during the exam period. Each midterm is worth 20% and the final is worth 40% of your grade. Neither midterm is comprehensive, but the final is: it will focus on the final third of the course but include several questions on earlier material. There will be no makeup midterms: if you miss one midterm, your final exam will be worth 60% to compensate; if you miss two midterms, it will be worth 80%. The makeup final will take place at the beginning of next semester and is outside of the instructor's control: eligibility as well as the time and date are determined by the Economics Department. Cheat sheets are not permitted on exams. Scientific calculators are allowed but graphing calculators are not. You may write in pencil or pen on your exam as it will be photocopied before being returned to you. We will check ID cards at each exam. Also, please note that it is not advisable to make early flight arrangements before knowing when your final exam will be held. This will NOT constitute for a makeup in the Spring. Sudden emergencies, of course, will be discussed and determined by the undergraduate chair.

Regrade Requests: Exam regrade requests must be made in writing within a week of receiving your graded exam. As we re-grade the entire exam, your score could rise or fall. You may not discuss your answers with an RI or the instructor before submitting a regrade request.

Installing R and RStudio

First, download and install R from http://cran.r-project.org/. Second, download and install RStudio by visiting http://rstudio.org/download/desktop and clicking the link listed

under "Recommended for Your System." If you have trouble, ask your RI or the instructor for help in office hours.

Here are links to some additional free resources to help you learn R:

- http://cran.r-project.org/other-docs.html
- http://www.twotorials.com/
- http://www.r-bloggers.com/google-developers-r-programming-video-lectures/
- http://cran.r-project.org/doc/contrib/Farnsworth-EconometricsInR.pdf
- http://www.ats.ucla.edu/stat/R/

TABLE 1. Schedule (Tentative)

Day	Date	Lecture	HW	Quiz	Exam	R Tut.
Wed	Aug 29	1. Introductory Statistics I				
Mon	Sept 3	No class				
Wed	Sept 5	2. Introductory Statistics II				
Mon	Sept 10	3. Introductory Statistics III	Yes			
Wed	Sept 12	4. Basic Probability I	Yes			1
Mon	Sept 17	5. Basic Probability II		Quiz 1 (L1-4)		
Wed	Sept19	6. Basic Probability III				
Mon	Sept 24	7. Discrete Random Variables I	Yes	Quiz 2 (L4-6)		
Wed	Sept 26	8. Discrete Random Variables II				
Mon	Oct 1	9. Discrete Random Variables III	Yes			2
Wed	Oct 3				Midterm I	
Mon	Oct 8	10. Continuous Random Variables I		Quiz 3 (L7-9)		
Wed	Oct 10	11. Continuous Random Variables II	Yes			
Mon	Oct 15	12. Continuous Random Variables III	Yes			
Wed	Oct 17	13. Sampling Distributions I		Quiz 4 (L10-12)		3
Mon	Oct 22	14. Sampling distributions II				
Wed	Oct 24	15. Confidence intervals I		Quiz 5 (L13-15)		
Mon	Oct 29	16. Confidence intervals II	Yes			
Wed	Oct 31	17. Confidence intervals III	Yes			
Mon	Nov 5	18. Confidence intervals IV				4
Wed	Nov 7				Midterm II	
Mon	Nov 12	19. Hypothesis testing I		Quiz 6 (L15 -18)		
Wed	Nov 14	21. Hypothesis testing II	Yes			
Mon	Nov 19	22. Hypothesis testing III	Yes			
Wed	Nov 21	No class				
Mon	Nov 26	23. Hypothesis testing IV				5
Wed	Nov 28	24. Regression I		Quiz 7 (L19 - 23)		
Mon	Dec 3	25. Regression II	Yes			
Wed	Dec 5	26. Regression III				
Mon	Dec 10	27. Revision				