

ECON 103 - Statistics for Economists

Summer 2017

GENERAL INFORMATION

Instructor: Minsu Chang

Class Times: MTWRF 9:00-10:45 am, McNeil room 103

Office Hours: These will be two days a week, 10:45-11:45 am, McNeil room 363.

Course Website: TBA (You can view your grades and log-on to the course discussion forum, Piazza, at <https://piazza.com>)

Email: minsuc@sas.upenn.edu

COURSE DESCRIPTION AND PREREQUISITES

Course Description: This course will teach you how to learn from data and understand uncertainty using the ideas of probability theory and statistics. After completing this course you will be able to carry out simple statistical analyses of your own using 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.

TEXTBOOK AND SOFTWARE

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 ancient, 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. RStudio is also available in the Undergraduate Data Analysis Lab (UDAL) in McNeil rooms 104 and 108–9. You will be taught to use R in lecture and through a series of tutorials that I will assign as homework. (See “Homework” below.) 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.

GRADING

Two Options:

$$\text{Overall Score} = (20\% \times \text{Quizzes}) + (40\% \times \text{Midterm}) + (40\% \times \text{Final})$$

OR

$$\begin{aligned} \text{Overall Score} = & (10\% \times \text{Participation}) + (10\% \times \text{Homeworks}) \\ & + (20\% \times \text{Quizzes}) + (30\% \times \text{Midterm}) + (30\% \times \text{Final}) \end{aligned}$$

After the first week of class, I will ask each of you whether or not you want to opt out of your participation and homework contributing towards your final grade. In the past, we have had some students state that they would prefer to be judged only on their performance in tests, as their learning style does not favor daily homework assignments and regular participation. However, I encourage you to include your homework and participation grades in your final grade for two reasons. First, these categories will be the easiest ones in which to score close to 100%. Second, to do well in ECON 103 requires consistent work every day, to make sure you are keeping up with the material and are practicing solving questions. By including participation and homeworks in your final grade, you are committing yourself to keeping up with the material.

Participation: Each lecture will feature activities in which you can earn participation credit through in-class discussion. You will earn further participation credit based on the frequency and quality of your contributions on Piazza, including questions, answers, and follow-ups. If your attendance is high, and you participate actively in class and online, you will receive 100%: these are essentially free points. However, spamming Piazza with unhelpful contributions will not gain you credit. Simply reading posts on Piazza is not sufficient to earn participation points: you must contribute through questions, answers, and follow-ups.

Homeworks and R tutorials: There will be a series of short daily homeworks, to make sure you are keeping up with the material and know how to solve problems. I will set a few questions related to the material covered each day (except for Thursday, when you should prepare for the quiz on Friday). We will go through some of these the next day in class, after the lecture. These will be posted on Piazza (with solutions) as the class progresses, and will include problems from the textbook as well as some additional questions.

There will also be weekly R Tutorials (with full solutions and code) posted on Piazza. R material will account for approximately 25% of the points available on each midterm and final, as well as occasional questions on the quizzes. It is therefore very important that you keep up with the R material by completing these tutorials, though I will not collect these assignments.

You can opt for your homeworks (excluding R tutorials) to count for 10% of your final grade, and if you do, you should submit your answers to questions from that week each Thursday. I will not be able to grade these all in detail, so as long as you have made good, honest attempts to solve the majority of questions, you will receive full marks on the homeworks. Regardless of whether you opt for these to count towards your grade, you should aim to complete the homework every day. You may work in groups for these problems, if this helps you. If you work in groups and use the solution keys, do so responsibly: you gain nothing by simply copying others or reading the solutions before you have made a good attempt at the problem.

Quizzes: There will be 5 weekly quizzes, administered at the beginning of class every Friday. Each quiz will cover basic material from the classes that week, since the last quiz. When calculating your quiz average, I will drop your lowest score and weight the remaining quizzes evenly. No makeup quizzes will be given. Quizzes will not be returned and answers will not be posted but I will go over the solutions in class.

Exams: There will be one 90-minute in-class midterm and a 90 minute final in the last class. Dates for these can be found in the course calendar below. The midterm and final are weighted equally for your final grade. The midterm covers material up to Lecture 9, but the final is comprehensive: it will focus on the second half of the course but include several questions on earlier material. Attendance at all exams is mandatory. In exceptional circumstances, e.g. a death in the family or a documented illness, please contact me in advance, using a private message in Piazza. Exam regrade requests must be made within three days of receiving your graded exam. As I re-grade the entire exam, your score could rise or fall. Exams will be photocopied before being returned and you may write in pencil or pen. Scientific calculators are permitted, graphing calculators are not.

TENTATIVE SCHEDULE

| Day | Date | Lecture | OH | Quiz | Exam | R tutorial |
|-----|--------|-------------------------------------|-----|-----------------|---------|------------|
| Mon | 22-May | 1: Descriptive Stats & Graphics I | | | | |
| Tue | 23-May | 2: Description States & Graphics II | | | | Try R |
| Wed | 24-May | 3: Regression I | Yes | | | |
| Thu | 25-May | 4: Basic Probability I | Yes | | | 1 |
| Fri | 26-May | 5: Basic Probability II | | Quiz 1 (L1-4) | | |
| Mon | 29-May | No Class (Memorial Day) | | | | |
| Tue | 30-May | 6: Basic Probability III | | | | |
| Wed | 31-May | 7: Discrete Random Variables I | Yes | | | |
| Thu | 1-Jun | 8: Discrete Random Variables II | | | | |
| Fri | 2-Jun | 9: Discrete Random Variables III | Yes | Quiz 2 (L5-8) | | 2 |
| Mon | 5-Jun | | | | Midterm | |
| Tue | 6-Jun | 10: Continuous Random Variables I | | | | |
| Wed | 7-Jun | 11: Continuous Random Variables II | Yes | | | |
| Thu | 8-Jun | 12: Sampling Distributions I | Yes | | | |
| Fri | 9-Jun | 13: Sampling Distributions II | | Quiz 3 (L9-L12) | | 3 |
| Mon | 12-Jun | 14: Confidence Intervals I | | | | |
| Tue | 13-Jun | 15: Confidence Intervals II | | | | |
| Wed | 14-Jun | 16: Confidence Intervals III | Yes | | | |
| Thu | 15-Jun | No Class | | | | |
| Fri | 16-Jun | 17: Confidence Intervals IV | Yes | Quiz 4 (L13-16) | | 4 |
| Mon | 19-Jun | 18: Hypothesis Testing I | | | | |
| Tue | 20-Jun | 19: Hypothesis Testing II | | | | |
| Wed | 21-Jun | 20: Hypothesis Testing III | Yes | | | |
| Thu | 22-Jun | 21: Hypothesis Testing IV | Yes | | | |
| Fri | 23-Jun | 22: Regression II | | Quiz 5 (L17-21) | | 5 |
| Mon | 26-Jun | 23: Regression III | | | | |
| Tue | 27-Jun | 24: Review | Yes | | | |
| Wed | 28-Jun | | | | Final | |

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

- <http://cran.r-project.org/other-docs.html>
- <http://www.twotutorials.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/>