






Introduction to Econometrics

ECON 318




Instructor Info

-  Yu-Wei Hsieh
-  Office Hrs: Thur. 10-12
-  KAP 318
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Course Info

-  Prereq: ECON 317
-  Tues & Thurs
-  8:00-9:50 am
-  KAP156

Lab Info

-  Tues & Thurs
-  6:00-6:50 pm
-  Tues & Thurs

TA Info

-  Ruozi Song
-  Office Hrs: TB
-  KAP 337

Overview This course aims at introducing econometric models and computer techniques that are useful to conduct economic research with data. You will learn the following skills:

1. Manage and analyze various types of economic data
2. Understand and apply proper econometric models to answer economic questions
3. Know how to use statistical software R to produce professional, beautiful graphs and statistical analysis for your clients, boss and co-workers.
4. Deeper understanding of statistics theory for advanced courses and graduate school

Who Should Take this Course We will emphasize both the theoretical foundation of econometrics and statistical software to prepare you the quantitative skills for competitive master/doctoral programs and for jobs like consulting/data scientist. Expect heavy workload; most students said it takes about **6-8 hours each week** to complete the homework assignments. Familiar with calculus is strongly recommend. *There will be an exam in the 3rd week.* Students who have difficulty in learning computer software and foreign language are recommended to consider other sessions.

Material

Required Texts: Theory

- Jeffrey M. Wooldridge. *Introductory Econometrics: A Modern Approach*, 6th Edition.
- Instructor's lecture notes (available on the blackboard)

Required Texts: Software

- R for Data Science <http://r4ds.had.co.nz/>
- Using R for Introductory Econometrics <http://www.urfie.net/>
- R for Beginners by Emmanuel Paradis, available at ftp://cran.r-project.org/pub/R/doc/contrib/Paradis-rdebuts_en.pdf
- Cookbook for R <http://www.cookbook-r.com/>

Supplementary Readings:

- R Graphics Cookbook: Practical Recipes for Visualizing Data by Winston Chang
- Naked Statistics: Stripping the Dread from the Data by Charles Wheelan
- Show Me the Numbers: Designing Tables and Graphs to Enlighten by Stephen Few

Grading Scheme

10%	Midterm #1
30%	Midterm #2
35%	Homework
25%	Group Project

Curving is at the discretion of the professor. While the grading scheme does not depend on the attendance, it is hard to apply a generous curve for a student with poor attendance. Typically, the best group project is awarded 90 pts.

Homework Policy Homework should be turned in at the beginning of the lecture. As there are 4 econometrics sessions, please print your name, TA's name and my name clearly. Hard copy is required: don't email me and TA your homework. No late homework will be accepted. Exception: You have doctor's notice or whatever reasonable excuse with a valid proof. It is your responsibility to inform me or TA in advance if you cannot turn in the homework on time. *You must include your answers, analysis, computer code and the key logical reasoning how you reach the conclusion. Simply write the solution will earn zero point*

Claiming Grading Mistakes/Missing Grade: We will have a strict policy on claiming grading mistakes and missing homework grade. If you have any problem regarding your homework grade, you should contact the TA within 7 business day after we return the graded homework. After that period no more change will be made on your grade. For the midterm exam you can only pick it up in class and discuss any grading problem with the instructor in class. Please understand there are always some dishonest students who try to change the exam sheet and claim 30 points grading mistake, and we shall have a mechanism to deter such behavior. Thank you very much for your cooperation.

Classroom Policy USC is a smoke-free facility. Cigarettes, including the electronic cigarettes, are strictly prohibited.

Office Hour and Email Policy While I will try to address your questions, **please ask course-material related questions only and be specific.** For example, "how to run regression in R" and "when is the midterm" are course-material related questions. "If I work very hard, will I pass?" and personal family issues are NOT course-material related questions, which should be addressed by your academic consultants. "I have no idea about what you taught today, can you go over again?" This is a course-material related question but too vague.

Academic Conduct Plagiarism—presenting someone else's ideas as your own, either verbatim or recast in your own words—is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11¹ Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>. Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity <http://equity.usc.edu/> or to the Department of Public Safety <http://capsnet.usc.edu/department/department-publicsafety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community—such as a friend, classmate, advisor, or faculty member—can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Support Systems A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

¹Behavior Violating University Standards <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriatesanctions/>

Class Schedule

MODULE 1: Review of Statistics

Week 1 1/8 Sampling Distribution handout

1/10 Law of Large Number and Central Limit Theorem

Week 2 1/15 Hypothesis Testing handout

1/17 HW-1 Due. Conditional Expectation

Week 3 1/22 HW-2 Due. and Review Session

1/24 Midterm 1

1/25 Last day to drop a course without "W"

MODULE 2: Classical Regression Theory

Week 4 1/29 What is Econometrics and Population Regression Ch 1., Ch.2-1

1/31 Sample Regression Function and OLS Ch.2

Week 5 2/5,7 Statistical Properties of the OLS estimator Ch.2

HW-3 Due

Week 6 2/12,14 Multiple Regression Ch.3-1,2,6; Ch.4-1,2,3,6; Ch.6-1, 2abc, 3ab, 6-4a

MODULE 3: Introduction to R

Week 7 2/19, 21 Introduction to R and Tidy Data

Week 8 2/26, 28 R Graph and RMarkdown

Week 9 3/5,3/7 Regression Analysis

HW-4 Due

Week 10 **Spring Break**

MODULE 4: Advanced Topics

Week 11 3/19 Dummy Variable and Interaction Terms Ch. 7-1,2,3,4

3/21 Advanced Data Technique in R Factor, Merge, Long and Wide Format

Group project member list Due

HW-5 Due

Week 12 3/26 HW-6 Due and Review Session

3/28 Midterm 2

Week 13 4/2,4/4 Instrumental Variable

Week 14 4/9,11 Panel Data

Week 15 4/16 Advanced Data Visualization
4/18 Machine Learning in Practice: Recommender System
HW-7 Due.

Week 16 4/23,25 Group Project Presentation