

Introduction to Econometrics

Summer Term 2019

Instructor

Gorkem Bostanci
535 PCPSE
Office Hours: TBA
bostanci@sas.upenn.edu

Course

LPS ECON-104-920
Time: TR 1:15-5:05
Location: PCPSE 101
CourseURL:https://github.com/gorkembostanci/ECON104_2019.git

Description

The main objective of the course is to make sure student thoroughly understands what econometrics is, what is it good for and what can we conclude using it. Other objectives of the course is to train the student in (i) handling economic data; (ii) quantitative analyses of simple economic models using computers; (iii) being able to comment on regression tables. The course covers linear regression models, simultaneous-equations models, discrete choice models and univariate time series models. Students are required to perform several econometric analyses of their own, using real-life data.

Prerequisite

ECON 101, ECON 103, MATH 104 and MATH 114 or MATH 115 or permission from instructor. In practice, students need to be comfortable with multivariate calculus including summations, differentiation, partial differentiation, and solving unconstrained optimization problems. Student should be comfortable with algebra and basic matrix algebra (linear algebra not required). Statistics knowledge should include random variables and probability distributions, point and interval estimation, hypothesis testing, simple linear regression, and some coding in *R*.

Recommended Readings

The recommended textbook for this course is Watson's *Introduction to Econometrics, 3rd edition*. I will not assign any textbook readings, however this course will mainly follow the book with small digressions. Prof. Diebold also has a text available online at <http://www.ssc.upenn.edu/~fdiebold/Textbooks.html>. I will post my slides on the course website above.

Required Software

This course will require use of a software package with statistical capabilities. You will be required to use *R*. Learning *R* will teach you how to code from basics. You will be required to submit your accompanying code. **IT IS YOUR RESPONSIBILITY TO READ UP ON *R* and LEARN HOW TO PERFORM THE REQUIRED ANALYSIS.** You should have a good understanding of *R* BEFORE you start the course. Students previously had difficulty catching up in the beginning of the course. *R* Studio is an interface for using *R*. It is downloadable, open source, free, and Professor DiTraglia has useful tutorials available <http://www.ditraglia.com/econ103/>. *R* Bloggers is a website dedicated to *R* related material. Also, MOOC sites like Coursera and edX usually have an active *R* lecture that you can follow.

Course Policies

This course adheres to the Economics Department's undergraduate policies. Please see <http://economics.sas.upenn.edu/undergraduate-program/course-information/guidelines/policies> for full details.

- Academic Integrity: Any student found in violation of academic integrity will receive no credit for the assessment in question. It will enter as a '0' in the gradebook.

- **Exam Attendance:** Attendance is mandatory for all exams. A missed exam will enter as a '0' in the gradebook. Valid exceptions can be found on the department website.

Assessment and Marks

The mark for this course will be allocated as follows (subject to change):

$$\text{Final Grade} = 50\% \text{ Problem Sets} + 25\% \text{ Midterm} + 25\% \text{ Final}$$

- *Problem Sets:* Problem sets will be posted on the course site and due at the start of class on the posted date. You may ask questions to each other but each of you has to submit individual problem sets. This course has a heavy load of homework due to the relatively short schedule. I do not recommend it for students who are employed or taking multiple classes during the summer.
- *Midterm:* There will be a 1.5 hour midterm in class on **July 23**.
- *Final:* There will be a 2 hour midterm on the last day of class on **August 8**. The final will be cumulative but heavily favored towards post-midterm material. I will adhere to the Department's guidelines.

Regrade Requests

Regrade request must be typed and submitted in writing following the Department's guidelines *within two days* of receiving your mark. You must state the exact reason for a regrade either due to a miscalculation adding the points or an alternative but valid solution. "I think I deserve more points for this answer" is not an acceptable request and will not be considered.

Additional Notes

Any substantial administrative issues should be addressed via e-mail or office hours. During or after class is not an appropriate time. The syllabus is a live document that I may update as we go along. I will post everything on the class website. Lastly, I expect all students to be present in the first lecture, to which I will frequently refer as we go along the course.

Course Topics

Class 1: Syllabus, What is Econometrics, Statistics Review

Non-Quantitative Review of What's to Come, Random Variables, Basic Calculations

Class 2: Estimation, Intro to Bayesian Econometrics and Shrinkage Estimators

Loss Functions, Estimators, Bias-Variance Trade-off

Class 3: The Classical Linear Regression Model - Single Regressor

OLS, Finite Sample Properties of OLS, Gauss-Markov Theorem, Test of Linear Restrictions

Class 4: The Classical Linear Regression Model - Multiple Regressors

OLS, Finite Sample Properties of OLS, Gauss-Markov Theorem, Test of Linear Restrictions

Class 5: **Midterm**

Class 6: Nonlinear Regressions with OLS

Also External-Internal Validity

Class 7: Dummy/Limited Dependent Variable Regressions and Panel Data

Logit, Probit, Censored, Truncated

Class 8: Endogeneity
Instruments, Diff-and-diff Estimation

Class 9: Experiments and Selected Topics in Time Series
Natural Experiments, RCTs, ARMA Processes, Unit Roots, Financial Econometrics

Class 10: **Final Exam**

Course Calendar

Class 1	Jul 9	Class 2	Jul 11	Class 3	Jul 16
Class 4	Jul 18	Class 5	Jul 23	Class 6	Jul 25
Class 7	Jul 29	Class 8	Aug 1	Class 9	Aug 6
Class 10	Aug 8				