Syllabus: Economics 120B -- will be updated with TA OH and PSET hours
Econometrics, Winter 2019
Prof. Eli Berman, UC San Diego

Description: This course prepares students for practical empirical research in an academic or business setting. It covers four major ideas in econometrics:

- quantifying uncertainty using confidence intervals
- using linear regression to infer causal relationships
- omitted variable bias
- using linear regression for prediction.
- And, we cover advanced concepts such as heteroskedasticity and fixed effects.

The material may be technically difficult and the workload substantial, particularly if you find math courses challenging or have never used statistical software. Your payoff will be skills and analytical tools that are useful for research, and in high demand in the marketplace.

Times: Tuesdays and Thursdays, 8 – 9: 20 am, Peterson 110
Tuesdays and Thursdays, 11am – 12:30, Pepper Canyon Hall (PCYNH) 120
You may attend either class, regardless of which you are enrolled in, as long as the Fire Marshall's seating safety limit is not exceeded. Seating priority should go to students in their enrolled class.
But, you **must** write the midterm and final with the class you are registered for.

Contact me? elib@ucsd.edu
Office hours: Monday 2-4pm ECON 218

Sections:

Monday	6:00 - 6:50	PCYNH 121
Wednesday	8:00 - 8:50	Mandelbaum B-210
Wednesday	9:00 - 9:50	Mandelbaum B-210

You may attend any section, regardless of which class you are enrolled in, provided that the Fire Marshall's seating safety limit is complied with. Sections aim to cover the same information, so you do not need to attend more than one. There will be no section the first week of class.

TAs: Nathaniel Bechhofer, nbechhof@ucsd.edu; Arman Khachiyan, akhachiy@ucsd.edu; Nobuhiko Nakazawa, nnakazaw@ucsd.edu; Pablo Ruiz Junco, pruizjun@ucsd.edu;

TA office hours will be held at TBA.
The TAs are very clever, and well trained in econometrics. I encourage you to take advantage of their help during office hours. There are no office hours the first week of class.

Readers: Stefan Faridani, sfaridan@ucsd.edu; Edoardo Briganti, ebrigant@ucsd.edu;

UIA: Qichen Huang (UIA), qih049@ucsd.edu

PSET (Problem Solving and Economics Tutoring lab):

- Econ 300
- Starts week 2
- Hours for 120B: TBA
- General hours: 5:30-8:30pm M-TH and Sunday 4-8pm.

- Hours for each week (PSET is closed for holiday weekends) and a list of when each TA/tutor will be in the lab each week will be here

Prerequisite: Econ 120A or ECE 109 or Math 180A or Math 183 or Math 186 or instructor permission.

Class Web Site: TritonEd.ucsd.edu

The class site will contain this syllabus, lecture notes, homework assignments, occasional class announcements, and discussions. You should check it regularly.
The **fastest** way to get an answer online is to choose <Discussions> and <**Ask the TA**>, which the TAs and I monitor more frequently than email. You may post anonymously.

Text: Introduction to Econometrics, updated 3rd Edition, by Stock and Watson (REQUIRED). An e-book is available through the site on TritonEd (via RedShelf; link on the left side of course page) $22.38 for 12 weeks access. (This is an *opt-out system,* so click Redshelf link to opt out within two weeks if you wish to avoid charges.)
Statistics with Stata: Updated for Version 10, 7th Edition, by Hamilton (OPTIONAL)

Software: Practical learning will require a software package called *Stata*. *Stata* is essential for problem sets, so access the campuswide license through TritonEd, or use in a lab

Stata Lab: Tutoring in Stata and other computer skills will be provided by superb undergraduate UIA.

Homework: Homework is an integral part of this course, --the best way to learn econometrics is to do it. I will periodically assign problem sets throughout the quarter. These will be posted on the TritonEd page, and it is your responsibility to check for them.

Homework will be graded on a four-point scale.
1 -- clearly incomplete, but has made a start towards answering some of the questions.
2 -- largely complete, but does not answer every question in full.
3 -- clearly well-done, and answers all of the assigned problems.
4 -- complete and at least 80% correct.

Students may work together on problem sets, although solutions must be written up and handed in separately (including any computer output). It is a good idea to attempt the problems on your own before meeting with a group, so that you fully understand (and can help your friends). Any homework you turn in must represent your own work.

Solution keys to the homework will be posted. As these solutions will be comprehensive and the homework is mostly graded for completeness, homework will not be returned. If you want a copy of your homework, please make a copy before you turn it in.

Your answers will be due at the *beginning* of class, normally one but possibly up to two weeks after a problem set is assigned. Late problem sets will **not be accepted** for any reason; if you cannot attend class, you may either have a classmate turn in homework for you, or you may turn it in to a TA in OH *before* class begins. Emailed homework will not be accepted.

You are allowed to miss one homework without penalty, as I will drop the lowest score before calculating the homework portion of your grade. The tradeoff for this benefit is that I will be strict about *not accepting late homework*.

Laptops, phones, tablets:

Put them in airplane mode and turn off Wifi when class begins. Your full attention is required and I can't possibly compete with your social network friends online. So, feel free to use your laptops and tablets to take notes, but without internet. If devices become a distraction I reserve the right to ban them.

Tests: We will have one midterm exam and a final. We reserve the right to record video of exams, to preserve academic integrity. **You must take all exams with the class you are enrolled in.**
The midterm will be administered Thursday Feb 7, in class.
The final for the 8am class: Thurs. March 21, 8 AM to 10: 50 AM. Location: check tritonlink
The final for the 11am class: Thurs. March 21, 11:30 AM to 2:30 PM. Location: check tritonlink.

There will be no scheduled make-up exams or alternative exam dates.
In the tragic case of illness, accident or misfortune precluding you taking the midterm –with documentation from a doctor, the police or a suitable authority, we will meet and decide on some grading solution.

Grades: The following formula will determine your course grade:
10% x Homework Grade +
Max (35% x Midterm Exam + 55% x Final Exam, 20% x Midterm Exam + 70% Final Exam)
Note: a weak midterm can be made up for by writing a strong final; the homework contributes mostly by helping you understand the material and practice for tests.

Grading Policy: If you think a mistake was made in grading your exam, you may request a regrade. You must write out your reason for a regrade and submit it with your exam within 10 days of when the exam was first returned to the class. Include an email address on your written explanation so we can let you know the result. If you request regrading, your entire exam is subject to regrade. This may bring to light some unnoticed errors, and *you may end up with a lower score.* Note that unless your answer is fully correct, the assignment of partial credit is a matter of judgment and subject to a grading scheme, so we are unlikely to change your grade --so as to treat all class members equally.

Cheating: Cheating is not allowed. If you are caught cheating, helping someone else cheat, or plagiarizing on an exam or homework, you will be referred to the appropriate campus office. Having unauthorized notes on your person during the exam constitutes cheating, for example, as does using a smartphone during an exam. One possible penalty is fail this class but campus imposes even stiffer penalties. Again, we reserve the right to monitor exams by video.

Miscellaneous:

Disabilities will be accommodated. For details contact our excellent staff: Jennifer Beauchamps and the staff in the office of undergraduate student affairs in Sequoyah Hall 245.
econugadvisor@ucsd.edu

For administrative matters regarding dropping or adding the course, waitlists and such, please contact the office of student affairs or use the online resources provided by the university at https: //students.ucsd.edu/ .

Questions? Please feel welcome to contact us through Ask a TA on the TritonEd site, email a TA, email me at elib@ucsd.edu or come chat during office hours. We don't bite.

COURSE OUTLINE (subject to change

1. Introduction: Why Study Econometrics?
Demand for Coffee.
Who needs data anyway? If you had some, what would you do with it?
Econometric models, parameter estimates, prediction and the testing of economic theories.
Getting good data.
Experimental vs. nonexperimental data. Cross-sections, Time-Series, Panels.
Reading: *Stock & Watson* - Chapter #1.

2. Probability and Statistics: A quick review
Probability, random variables, the normal distribution and the central limit theorem, inference, confidence intervals and hypothesis testing. Asymptotics of the sample mean.
Using *Stata*.
Reading: Chapters #2 and #3.

3. Simple Regression (one regressor)
Fitting a line through a cloud of points.
Least squares, unbiased estimates, consistent estimates, confidence intervals, hypothesis testing, omitted variable bias, R^2.
Reading: Chapters #4 and #5.

4. Multiple Regression: Estimation
The second explanatory variable, interpreting coefficients, omitted variable bias.
Efficiency & heteroskedasticity.
Reading: Chapter #6.

Midterm -- Thursday, Feb 7, in class

5. Causal Inference and Random Assignment
Random assignment vs. omitted variable bias.
Reading: Ch #13.

6. Multiple Regression: Inference and Nonlinearity
Confidence intervals (CI) for parameters, CI for predictions, hypothesis testing, single (t) vs. multiple (F) tests.
Etiquette in reporting results. modeling nonlinear functions. interaction terms between independent variables
Reading: Chapters #7 and #8.

7. Sources of Bias: measurement error, sample selection, simultaneity and omitted variables
Omitted Variable Bias again, measurement error, fixed effects, sample selection, simultaneity.
Reading: Chapters #9 and #10.