

Economics 120B
Econometrics, Winter 2018
Prof. Dahl, UC San Diego

Description: This course aims to prepare students for practical empirical research in an academic or business setting. It covers the fundamentals of regression analysis, including estimation and hypothesis testing in a multivariate framework. The course also briefly covers advanced concepts such as heteroskedasticity, fixed effects, and omitted variable bias. An emphasis will be placed on determining when causal relationships can be inferred from data.

The material can be difficult and the workload substantial, particularly for people who find math courses challenging. However, your payoff for all this work is a set of skills and analytical tools that are extremely useful and in high demand in the marketplace.

Class Times:

Tuesdays and Thursdays, 8:00 – 9:20 am, PETER 110
Tuesdays and Thursdays, 9:30 – 10:50 am, PETER 110

Instructor: Gordon Dahl
office hours: Tuesdays, 11:00 am – 12:20 pm
location: ECON 324
phone: 822-0644
email: eco120b@gmail.com
(*email is the preferred contact method*)

Problem Solving and Economics Tutoring (PSET) Lab: Teaching assistant office hours for the class will be held in the Problem Solving and Economics Tutoring (PSET) lab, which is located in Econ 300. Graduate and undergraduate TAs will be available to help you understand the course material and learn to tackle problems successfully. In Econ 300 there is room for you to work on your homework and readily available help if you get stuck. Please check the web page for lab hours, which may vary right before and after exams:
<https://economics.ucsd.edu/undergraduate-program/courses/pset-lab.html>

The PSET lab will start in week 2 and end on Thursday of week 10.

The graduate and undergraduate TAs are a valuable resource, and I encourage you to take advantage of their help in the PSET lab. If you have a general question about the class, rather than a specific question about content (which you should ask in the PSET lab), please use the class email eco120b@gmail.com.

Review Sessions:

Thursdays 7:00 – 7:50 pm, MANDE B-210
Thursdays 8:00 – 8:50 pm, MANDE B-210
Fridays 3:00 – 3:50 pm, SOLIS 104
Fridays 4:00 – 4:50 pm, SOLIS 104

You may attend any of the review sessions, regardless of which class you are registered for. They will normally focus on helping students get started on the homework or reviewing topics covered in class.

There are no review sections the first week of class. If you want to get started on something immediately, a good task would be to get set up with Stata, the software package we will be using this quarter. You might want to try visiting a physical lab which has Stata, figuring out how to use Stata "virtually", or purchasing your own copy and installing it.

Class Web Site: <https://tritoned.ucsd.edu/>

The class web site contains the syllabus, lecture notes, homework assignments, and occasional class announcements. You should check it regularly as you are responsible for any information posted there in addition to any announcements made in class.

Text: For this course we will be using a Pearson eBook for *Introduction to Econometrics* by Stock and Watson. The eBook access for the course is being delivered through RedShelf on the Blackboard system (i.e., TritonEd). The cost of the digital materials will automatically be charged to your student account at a deeply discounted price. You are responsible for paying for charges applied to your student account. When you log into Blackboard and click on the eBook link, you will automatically be taken to the content without having to register, set up an account or enter an access code. The first time you access the eBook you will see a screen where you can click to "View Course Materials."

If you want to opt out of this program and not get access to the required digital materials you can click the "Opt-out" button on this same screen. You will then need to purchase materials elsewhere on your own. If you purchase a printed version of the textbook, it is up to you to make sure it lines up with the eBook version, especially for assigned homework problems. If you have any questions about the eBook or this charge to your student account, you should contact the UC San Diego Bookstore directly.

Note that the digital content is free for the first two weeks of classes. After two weeks, your student account will be charged a special reduced price unless you opt-out of the content. To opt out click the RedShelf link inside TritonEd and follow the opt out prompt; you must opt out by 1/20/18. Click [here](#) to view how to access your eBook or opt out.

Software: Part of the course involves learning to use a software package called *Stata*. *Stata* is essential for problem sets, so you need to be able to access *Stata* in a physical lab, a virtual lab, or purchase your own copy. Students have physical access to *Stata* in ECON 100. You can set up remote virtual access following the directions at:

<http://acms.ucsd.edu/students/govirtual/index.html>

Individual copies of *Intercooled Stata* (i.e., *Stata/IC*) can be leased for six months for \$45 from:

<http://www.stata.com/order/new/edu/gradplans/student-pricing/>

If you would like a book to help you learn Stata, a good suggestion is *A Gentle Introduction to Stata, Fifth Edition*, by Acock. However, this book is not required for the course. There are also many online sites devoted to helping individuals learn Stata. For a list, see:

<https://www.stata.com/links/resources-for-learning-stata/>

Homework: Homework is an integral part of this course, because the best way to learn econometrics is to do it. I will periodically assign problem sets throughout the semester. These assignments will be posted on the web, and it is your responsibility to check the class web page regularly. Homework assignments will generally be due one week later. For example, if a homework assignment is posted on a Tuesday (any time before midnight), it will be due the following Tuesday unless otherwise specified. You will always have at least one week to complete the assignment.

Your homework needs to be turned in at the *beginning* of class on the due date and late problem sets will not be accepted for any reason. If you cannot attend class, you can either have a classmate turn in your homework for you, or you can turn it in to any of the 120B TAs *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.

Homework will be graded on a three-point scale. A score of 1 will be given to homework which is clearly incomplete, but has made a start towards answering some of the questions. A score of 2 will be given to homework which is largely complete, but does not answer every question in full. A score of 3 will be given to homework which is clearly well-done, and answers all of the assigned problems, including any *Stata* questions.

Students can work together on problem sets, although solutions must be written up and handed in separately (including any *Stata* output). It is a good idea to attempt the problems on your own before meeting with a group. While you can collaborate with others, any homework you turn in must represent your own work.

Solution keys to the homework will be posted on the class web page. As these solutions will be comprehensive and the homework is only 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.

Tests: There will be a midterm and a final exam. The midterm will be administered during regular class time, on Tuesday, February 13. The final exams for each class will take place according to the official final exam schedule. The class which runs from 8:00 am to 9:20 am will have their final exam on Thursday, March 22 from 8:00 – 11:00 am. The class which runs from 9:30 – 10:50 am will have their final exam on Tuesday, March 20, from 8:00 – 11:00 am. Locations for the final exam have not yet been designated.

You must take both the midterm and the final exam at the scheduled time for the class you are enrolled in. If you have three or more final exams on the same day, then you may take the final exam with the other class. To get approval to do this, send an email to ecol20b@gmail.com at least two weeks before the final exam, with documentation of three exams on the same day as an attachment.

There will be no make-up exams, and any conflicts or emergencies should be approved by me in advance of the exams. In case of illness or accident at the time of the midterm – with proper

documentation from a doctor or the police – the final will be weighted 90%.

Grades: The following weights will be used to determine your course grade:

Homework: 10%

Midterm exam: 40%

Final exam: 50%

Grading Policy: You should check to make sure that you have received credit for your homework; scores will be recorded online no later than one week after the due date. If you turned in an assignment, but don't see a score, let us know within two weeks of the due date. After that point, we will throw out the homework assignments and have no way of verifying that you did the assignment so that we can give you credit.

If you think a mistake was made in grading your exam, you may ask for a regrade. You must write out your reason for a regrade and turn it and your exam in within 10 days of when the exam is first returned to the class. Include an email address on your written explanation so we can let you know the result of the regrade. If you ask for a regrading, your whole exam is subject to regrading. This may bring to light some previously unnoticed errors, and you may end up with a lower score, not higher. Note that unless your answer is fully correct, the assignment of partial credit is a matter of judgment, and we are unlikely to change your grade since we want to treat all class members fairly.

Cheating: Cheating will not be tolerated in this class. If you are caught cheating, helping someone else cheat, or plagiarizing on an exam or homework, you will be penalized. Having notes (electronic or paper) on your person during the exam constitutes cheating, as do other forms of cheating. One possible penalty is a failing grade in my class.

Miscellaneous: Disabilities will be accommodated; contact the office of undergraduate student affairs in Sequoyah Hall 245. For all matters regarding dropping or adding the course, waitlists, etc., please contact the office of student affairs or use the online resources provided by the university.

If you have any further questions please feel welcome to email eco120b@gmail.com or come talk during office hours.

COURSE OUTLINE (rough guide and subject to change):

1. Introduction: Why Study Econometrics?

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, efficiency & heteroskedasticity, omitted variable bias.

Reading: Chapter #6.

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 for 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.