



FLORIDA STATE  
UNIVERSITY

## **ECO 4421: Introduction to Econometrics**

**Professor Christopher Clapp**

**Syllabus, Spring 2018**

### Class

Location: 0033 BEL

### Professor

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Meetings:

M W 9:30am-10:45am

Phone: (850) 645-0756

Office Hours:

M 11:00am-12:00pm

or by appointment

Office Hours: T 12:00pm-1:00pm

## **Course Description**

Most of the economics you have learned so far has been economic theory: from the beauty of the invisible hand to the cause(s) of the Great Depression to... well, you get the point. But how do we know if a theory is valid or just hot air? This class will teach you the basic tools that economists and other social scientists use to provide empirical support for their hypotheses.

Specifically, we'll cover the methods of statistical analysis of economic data. The class begins with a review of basic statistical methods and probability distributions, but you should already have familiarity with these topics. We will discuss estimation and hypothesis testing within a simple, one-variable framework and then proceed by considering multivariate analysis. We will also consider hypothesis testing under a variety of problematic conditions. Throughout the course, data management and analysis using professional statistical software applications will be emphasized (as such skills will both reinforce the statistical concepts being covered and will be very valuable to you on the job market).

## **What's My Incentive for Taking This Course?**

This course is designed to provide you with the basic tools for data analysis. At best, you'll go on to conduct your own empirical research that causes current researchers to slap their foreheads and say, "Why didn't I think of that?" At worst, you'll understand how to apply the scientific method to economic problems, formulate and estimate econometric models, interpret model results, and critique statistical analysis you encounter. While the direct benefit of these skills is that they are rewarded in a variety of careers, more importantly (even if it doesn't seem like it now), you'll also benefit from an increased understanding of how we use data and statistics to understand what's going on around us. Why does this matter? As journalist Clive Thompson *stated*, "We live in a world where the thorniest policy issues increasingly boil down to arguments over what the data mean."

If you don't understand statistics, you don't know what's going on - and you can't tell when you're being lied to."

Along the way you can expect to:

- Use the economic triple-threat (intuition/pictures/math) to learn econometric theory.
- (Re)Learn statistical concepts and develop a deeper understanding of statistics.
- Gain an appreciation for the difference between correlation and causation.
- Learn how economists test hypotheses with data.
- Explore and summarize piles of numbers in new ways.
- Become proficient in using statistical software.
- Recognize the limits of the econometric tools covered (and be hungry to learn more???)

## **Expectations**

- **I expect that students will (tips for doing well):**

- Attend class regularly and arrive on time.
- Ask questions about anything presented in class that is confusing, regardless of whether or not everyone else seems to "get it." If you're confused, someone else certainly is.
- Review the slides after every class. There are no required textbook readings, so this is a very reasonable expectation.
- Regularly ask me clarifying questions about anything from previous classes that was unclear.
- Visit me in office hours with more in-depth questions and for help with problem set questions.
- Work in groups to figure out problem set questions. No one knows nothing, and everyone knows something! Problem sets are designed to reinforce what we've covered in class and make you think by extending that material (not have you replicate an example with slight differences), so I do not expect that anyone will be able to answer my questions without some help.
- Respect my time by:
  - \* Checking the syllabus before emailing me to ask procedural questions.
  - \* Making every possible attempt to attend my regularly scheduled office hours. That means that aside from other classes, you should plan your schedule around my office hours.
  - \* Visiting me in office hours only if you regularly attend class.
  - \* Attempting problem set questions in advance before asking me for help with solutions.
  - \* Asking pointed questions in class and office hours (not questions of the form, "How do you do 1a? ... How do you do 1b? ...")

- **In return, you can expect that I will:**

- Hold class regularly. Begin and end class on time.
- Prepare lectures that both explain important concepts and stimulate you to think about those concepts in greater depth.

- Update those lectures regularly to reflect advances in the economic literature and current events.
- Be accessible in regularly scheduled office hours to help you with any questions you may have and by appointment if you have reasonable conflicts with my office hours.
- Treat all students with respect.

## Prerequisites

The official prerequisite is Analysis of Economic Data (ECO 3431). While that is all you'll need for this class, econometrics is a difficult subject and one of the most advanced classes in the major. For these reasons, it is my opinion that taking this class when you are an advanced undergraduate (Junior or Senior) is in your best interest.

## Evaluation

Your final grade in this course will be related to performance in several areas. The weight placed on each component will be as follows:<sup>1</sup>

Problem Sets (4)	20%
Project	10%
Midterms (2)	40%
Final Exam	30%
Class Participation	03%

The problem sets will contain both theoretical problems and computer exercises. There will be five problem sets, which will be posted on the FSU Canvas site at least one week before the due date (please email to remind me if I fail to do so). The problem sets are for your benefit so you can practice the material we're covering and get feedback on your understanding of it. To give you an incentive to keep up with the work, after you have finished your problem set, you must take a short, on-line assessment on Canvas. The questions on the assessment are based on the problem set and will be trivial if you have completed the problem set. There will be a time limit, so you should not attempt the assessment until you have completed the problem set. The link to each assessment will expire at 11:45pm on the date indicated in the Course Outline that follows. You will not be able to complete the assessment after this deadline (see the "Course Policies" section for more information).

I understand that students sometimes have legitimate reasons for being unable to complete problem sets on time or give their full effort, so only the best four problem sets will count toward the course grade (each worth 5%). You are welcome (and encouraged) to form study groups and discuss the problem sets with each other, but everyone should write-up his/her own problem set and complete the assessment independently.

The project will involve completing several tasks. You will have to obtain data from the Internet, estimate an econometric model (or several models) using computer software, and the interpret results. The project will be due at the start of the last class on **Wednesday, April 25th**. The project constitutes FSU's Computer Competency Requirement and you must earn at least a "C-" on this project.<sup>2</sup> I will provide more detail on my expectations for the project at a later date.

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<sup>1</sup>If you have previously taken this class with me as an instructor, the weight of the problem sets will be shifted to the exams.

<sup>2</sup>See the next section for more details regarding the Computer Competency Requirement.

There will be two midterm exams. The first midterm will take place on **Wednesday, February 14th**, and the second one on **Wednesday, March 28th**, during the regular class time.<sup>3</sup> No make-up midterms will be given for any reason, valid or otherwise (see the “Course Policies” section for more information).

The final exam will be held on **Thursday, May 3rd from 10:00am-12:00pm**. Please let me know if I have misread the university exam schedule. There will be no make-up final scheduled, except in extreme circumstances (see the “Course Policies” section for more information).<sup>4</sup>

Class participation grades will be based on your level of active, attentive, inquisitive participation in the class and/or in-class assignments.

## Computer Competency Requirement

This course satisfies the university Computer Competency Requirement and includes a data analysis project using computer software. In order to fulfill FSU’s Computer Competency Requirement, the student must earn a “C-” or better in the course, and in order to receive a “C-” or better in the course, the student must earn at least a “C-” on the computer competency component of the course. If the student does not earn a “C-” or better on the computer competency component of the course, the student will not earn an overall grade of “C-” or better in the course, no matter how well the student performs in the remaining portion of the course.

## Letter Grade Distribution

I do not have hard and fast ranges for letter grades. Instead, cut-offs are set by examining the distribution of grades and determining significant differences in performance. Historical data suggests that the letter grade ranges will be no less beneficial to students than the standard ranges (listed in the table that follows).<sup>5</sup>

≥ 100.0	A+	87.0 - 89.9	B+	77.0 - 79.9	C+	67.0 - 69.9	D+	
93.0 - 99.9	A	83.0 - 86.9	B	73.0 - 76.9	C	63.0 - 66.9	D	< 60.0 F
90.0 - 92.9	A-	80.0 - 82.9	B-	70.0 - 72.9	C-	60.0 - 62.9	D-	

## Materials

### Textbooks

There is no required textbook in this class, but these are recommended/optional references.

<sup>3</sup>The last day to drop/withdraw without receiving a grade is traditionally at the end of the 7th week of classes. Please confirm this with the current academic calendar (**Fall** or **Spring**). I will make every effort to post your first midterm grades before this date so you can optimize accordingly, but I cannot promise that this will be feasible.

<sup>4</sup>Please note that FSU policy clearly states that, “The scheduling of a final examination at any time other than the regularly scheduled final examination period is prohibited by University policy. The final exam schedule is found in the Registration Guide located at <http://registrar.fsu.edu/>. *Unless an exam is given during the final examination period, no test may be given during the last week of classes.*” (There are a few exceptions pertaining to online/distance learning classes and classes with seating constraints, but I believe those are noted on the exam schedule website.) Every semester, students struggling to finish their assignments tell me that they have finals during the last week of the semester. If this is the case in one of your other classes, I strongly encourage you to (politely) remind the offending faculty member of the Undergraduate Final Examination Policy and bring the issue up with the Department Chair and/or Dean of the course in violation if he or she does not adjust the class schedule. It is not fair to students for faculty to expect them to take their finals a week early, so you should not feel bad about voicing concern over this issue.

<sup>5</sup>Please note that the University does not allow me to enter a grade of “A+” when submitting final grades, so this designation is important only for your internal satisfaction and letters of recommendation.

- Recommended: *Introductory Econometrics: A Modern Approach*, 6th Edition, by Jeffrey M. Wooldridge (ISBN-10: 130527010X)
  - Previous editions are also available (and they are usually cheaper). They are close substitutes for the current edition, but it is up to you to determine any differences.
  - I will place a copy of an earlier edition on reserve at Strozier Library.
- Optional: *Introduction to Econometrics*, 3rd Edition, by James H. Stock and Mark W. Watson (ISBN-10: 0138009007)
  - I will place a copy of an earlier edition on reserve at Strozier Library.
- Optional: *Mastering 'Metrics: The Path from Cause to Effect*, 1st Edition, by Joshua D. Angrist and Jörn-Steffen Pischke (ISBN-10: 0691152845)
  - This book covers some advanced topics in a very accessible way. Unfortunately, we probably won't be able to devote much time to these topics this semester, so I'm listing this for your reference.

## Data Analysis and Statistical Software

The software that we are going to use in this class is Stata. In class, I will show you how to use this program and read its output. By the end of the course you should know how to read and interpret Stata output. However, you are allowed to use any statistical software you are comfortable working with for the problem sets and project.

- Recommended: Stata is available on computers at the Economics Help Desk (Bellamy 241) and via the [myFSUVLab](#) (virtual lab). Note that the [myFSUVLab](#) is fairly new and still very buggy. I have no control over the [myFSUVLab](#), so you should contact ITS early and often if you have problems with it (they don't seem to realize how often students have trouble with the application).
- Optional: A [Stata 6-month license](#) for use outside the labs. Purchasing *Stata/IC* will allow you to use your computer to answer all problem set questions, complete your computer competency project, and use Stata for other research projects.

## Office Hours

My office hours for this class are listed on the first page of the syllabus. Those hours are for you, so please make use of them (be it with questions about course material, to discuss a research idea, or just to chat). You do not need to make an appointment to see me during my office hours; just drop by. I will be in my office during those times. If a sufficient number of students attend at the same time, we may move to a bigger room, and I will leave a note on my door to let you know where we are.

There are economies of scale in the production of knowledge, so please make your best effort to attend during the posted times. However, if you have a legitimate conflict (such as another class) or want to talk with me one-on-one, you are welcome to make an appointment for another time. I am happy to meet with students outside of office hours. I only ask that you do your absolute best to attend the regularly scheduled office hours since I have many students and responsibilities other than teaching. Also, if you know in advance that you cannot make a scheduled appointment, please email me to let me know.

## Course Policies

### • General

- All laptops, cell phones, and other personal communication devices must be turned off and put away during class (unless I instruct you to use them as part of a class activity). If you are expecting an emergency call prior to class or have an accommodation for the use of one of these devices, please let me know.
- The class webpage is available through the Canvas @ FSU portal. I will use it to post announcements, assignments, and grades. Please check it regularly.
- Email is the official means of communication for out-of-class communication. In other words, you are expected to check your FSU email account regularly.
- Any and all results of in-class and out-of-class assignments and examinations are data sources for research and may be used in published research. All such use will always be anonymous.

### • Attendance

- There is no attendance requirement (beyond the first day), but regular attendance is necessary (but not sufficient) to do well in the class.

### • Assignments<sup>6</sup>

- I post answer keys after most assignments are due, so no late assignments will be accepted for any reason, valid or otherwise.<sup>7</sup> Not turning in an assignment, handing it in late, or failing to take an on-line assessment before the link expires will result in a grade of zero.
- If you are unable to turn in an assignment (that has to be handed in) in person, I will accept a LEGIBLE scan of your work in a SINGLE PDF document via email so long as I receive it before the end of class on the appropriate date. The legibility of scans is entirely at my discretion. I will not accept cell phone pictures of assignments (often, they're too hard to read) or a separate document for each page being submitted (they're a nuisance for me to deal with).

### • Exams<sup>8</sup>

- No make-up midterms will be given for any reason, valid or otherwise. Doing so would create concerns about uneven treatment, and I can't be sure that classmates won't share information about what was on the exam.
  - \* Should you miss a midterm because of a valid excuse, the weight of the missed midterm will be shifted to the final exam.
  - \* Should you miss a midterm for any other reason, you will receive a grade of zero on the exam.
- There will be no make-up final scheduled, except for the cases of serious health problems, family emergency or exam conflict (see [University Final Examination Policy](#)).
- In each case, notification and/or documentation is required in a timely manner. Whenever possible, you should contact me before the exam regarding your absence.

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<sup>6</sup>The problem sets and project constitute the assignments in this class.

<sup>7</sup>Reasons include, but are not limited to: illnesses, athletic competitions, work trips, job fairs, job interviews, travel reservations, relative illnesses, relative funerals, out-of-town weddings, car accidents, car trouble, scooter trouble, tickets to see Billy Joel in concert, and emergency visits to the veterinarian with your dog.

<sup>8</sup>The midterms and final exam constitute the exams in this class.

- **Validating Excuses**

- Should you miss an exam or an extended period of class due to an illness or other valid excuse, please contact The Dean of Students Department to have your circumstances validated. Upon confirming your situation as they see fit, a member of the Department staff will contact your professors and let them know that your excuse is valid. This saves me the trouble of trying to validate student excuses (which I have no idea how to do) and saves you the hassle of presenting an excuse to multiple faculty members.
  - \* The Dean of Students Department is located on the 4th Floor of the University Center Building A in Suite 4100. Their phone number is (850) 644-2428.
  - \* You can find additional contact information at their
  - \* website: <https://dos.fsu.edu/contact-us/>. Note that the individuals listed in the “Case Management Services” section are responsible for validating excuses.
- If the Dean of Students Department cannot or will not validate the reason you missed an exam, you will receive a grade of zero on that exam. There are no exceptions to this policy.

### **Academic Integrity (See also the “Academic Honor Policy” section)**

I apologize for the heavy handed tone of this section. It is intended to protect the many honest students who take my class and the University as a whole.

As a member of the Student Government Judicial Branch as an undergraduate and a graduate student at a university where any non-trivial act of lying, cheating or stealing results in expulsion, I take Florida State’s Academic Honor Policy very seriously. All alleged honor violations brought to my attention will be handled by following the Academic Honor Policy process (see [Flowchart](#)). If, in my judgment, the preponderance of the evidence indicates that a student has committed an honor violation on an assignment, that student will receive an immediate grade of zero for that assignment, regardless of the outcome of the Academic Honor Policy process. I trust every student in this course to fully comply with all of the provisions of the Academic Honor Policy. Here are specific expectations:

- On exams, it is expected that you will neither receive nor give aid, nor access any material other than items explicitly outlined in the exam instructions (no cell phones, laptops, etc.).
- On problem sets, you may (and should!) work with other students, but it is expected that you will write out your own answers and take the online assessments on your own. It is in your interest to work through these problems on your own before discussing them with others, as this will give you crucial help in preparing for the exams.
- During the entire semester, it is expected that you will not access old problem sets, exams, or answer keys at any time. This includes websites that post solutions under the guise of tutoring. (These sites both facilitate cheating and steal the intellectual property of the author.)
- During the entire semester and thereafter, it is expected that you will neither post any class material on the internet nor share any class materials with other students through any other means. Furthermore, if you become aware that this has occurred, you are obligated to let me know immediately.
- You may study with students from the other sections being taught this semester, but you may not share posted solutions or solicit/give any information about the content of exams or the final.

## **University Attendance Policy**

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

## **Academic Honor Policy**

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/academic-resources/academic-integrity-and-grievances/academic-honor-policy>.)

## **Americans With Disabilities Act**

Students with disabilities needing academic accommodation should:

1. register with and provide documentation to the Student Disability Resource Center; and
2. bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class.

Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from the Student Disability Resource Center has been provided.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center  
874 Traditions Way  
108 Student Services Building  
Florida State University  
Tallahassee, FL 32306-4167  
(850) 644-9566 (voice)  
(850) 644-8504 (TDD)  
sdrc@admin.fsu.edu  
<http://www.disabilitycenter.fsu.edu/>

## **Free Tutoring from FSU**

On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of on-campus tutoring options - see <http://ace.fsu.edu/tutoring> or contact [tutor@fsu.edu](mailto:tutor@fsu.edu). High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

## **Syllabus Change Policy**

"Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice."

## Tentative Course Outline

The weekly coverage might change as it depends on the progress of the class.

Course Schedule for Introduction to Econometrics							
Week	Week Of	Date	Day	Topic/Assignment	W	SW	Assignment
1	January 8	01/08	Mon	Review of Statistics	B&C	2	
		01/10	Wed	Introduction: Nature & Scope of Econometrics			
2	January 15	01/15	Mon	<b>Martin Luther King Jr. Day – No Class</b>			
		01/17	Wed	Review of Statistics (cont.)	B&C	2	
3	January 22	01/22	Mon				
		01/24	Wed	Probability Distributions	B	2	Prob. Set 1
4	January 29	01/29	Mon				
		01/31	Wed	Statistical Inference (Hypothesis Testing)	C	3	
5	February 5	02/05	Mon				
		02/07	Wed	Simple Regression: Overview	2	4	Prob. Set 2
6	February 12	02/12	Mon				
		02/14	Wed	<b>Mid-Term Exam</b>			<b>Exam</b>
7	February 19	02/19	Mon	Mid-Term Exam Review			
		02/21	Wed				
Helpful note: the last day to drop a class without receiving a grade is traditionally at the end of the 7th week.							
8	February 26	02/26	Mon	Regression: Inference	2&4	5	
		02/28	Wed				Prob. Set 3
9	March 5	03/05	Mon	Multiple Regression: Estimation	3	6&7	
		03/07	Wed				
	March 12	03/12	Mon	<b>Spring Break – No Class</b>			
		03/14	Wed	<b>Spring Break – No Class</b>			
10	March 19	03/19	Mon	Multiple Regression: Assumptions Overview	3	6	
		03/21	Wed	Functional Forms	6	8	Prob. Set 4
11	March 26	03/26	Mon				
		03/28	Wed	<b>Mid-Term Exam</b>			<b>Exam</b>
12	April 2	04/02	Mon	Mid-Term Exam Review			
		04/04	Wed				
13	April 9	04/09	Mon	Dummy Variables	7	8	
		04/11	Wed				
14	April 16	04/16	Mon	Heteroskedasticity	8	15	
		04/18	Wed	Autocorrelation	10&12	14	Prob. Set 5
15	April 23	04/23	Mon	Model Specification	9	9	
		04/25	Wed				Project
Final	May 3	05/03	Thu	<b>Comprehensive final exam from 10:00am-12:00pm</b>			<b>Final</b>