The College of William and Mary

ECON 308: Econometrics

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Tyler Hall 337

Course meetings: Tyler Hall 113, MWF 9:00 AM – 9:50 AM
Office hours: MW 1:00 PM – 2:00 PM, F 10:00 AM – 12:00 PM

1. Course overview

Quantitative evidence has become increasingly important for informing solutions to challenging policy problems. Possessing the ability to create, interpret, and present quantitative evidence is essential for anyone beginning a career in public policy.

ECON 308 is an introduction to the methods and techniques of econometrics analysis. Our goal is to examine the linear regression model and develop a strong understanding of how to interpret and apply the model to a variety of economic problems and to test hypotheses. We examine the assumptions underlying the model and develop tools for testing these assumptions and techniques for addressing and correcting violations of the model assumptions. This course includes training in the responsible and ethical conduct of research, including discussions of the proper use of data and reporting of results in order to avoid fabrication, falsification, and plagiarism.

This class serves four important purposes. First, it provides an introduction to applied statistical methods. Second, it prepares students for more advanced statistics courses. Third, it emphasizes writing about and communicating statistical results to readers who may lack statistical training. Finally, it will help you develop the habits of mind that will make you careful users of data and statistical computing. To serve those ends, in this class you will develop quantitative skills by actually practicing them.

Our objective in this course is to:

1) Understand the use of statistical analysis;
2) Read and critique statistical analyses in academic and professional publications.
3) Present statistical information in a technically complete way that is accessible to a non-technical audience.
4) Specify, estimate, present and interpret econometric models in order to better understand important economic, business and policy issues.

2. Course Materials

Required Readings: *Introductory Econometrics, A Modern Approach*. 6e, Jeffrey M. Wooldridge. ISBN-13: 978-130527010-7.

An e-book of *Introductory Econometrics* can be purchased online for a very reasonable price.

A great supplemental reference available on Blackboard is *Basic Econometrics with Stata*. Carl Moody. 2005.

3. Assignments and grading

Suggestions for success in this course: Come to every class and take good notes. The lectures will cover the most important materials and will discuss real life applications. In addition, I will solve in class problems representative of the exam questions.

3.1. Grading

I will calculate course grades based on the following items. You need to complete all items to receive course credit. Students not completing all items will receive an Incomplete.

Percent	Item
20	Homework assignments
20	Test 1
20	Test 2
30	Test 3 (Final Exam)
10	Final paper

In general, I will base grades on the following percentage scale with partial-percents typically rounded to the nearest full percent: A=93-100; A-=90-92; B+=88-89; B=83-87; B-=80-82; C+=78-79; C=73-77; C-=70-72; D+=68-69; D=63-67; D-=60-62; F<60.

In a class such as this, any grade below a "B" on any assignment, exam, or paper suggests that a student is having trouble grasping basic course ideas, which are essential building blocks for future courses and the work world. Please talk with me if you find yourself having difficulty.

Finally, because errors sometimes creep into grade calculations (and on rare occasions assignments are misplaced after they have been handed in) please keep a copy of all work submitted for this course until final grades have been processed.

3.2. Homework assignments

These assignments will focus on real life policy questions. It is crucial that you complete these assignments on time. Grading will stress two things: (1) the degree to which you have made a strong effort to complete all parts of each assignment; and (2) the extent to which your work, especially the writing component, is polished and professionally done.

3.3. Exams

We will have three tests. The exam will ask you to perform calculations and will emphasize interpreting results.

3.4. Accommodations

William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels they may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2512 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see http://www.wm.edu/sas

3.5. Honor Code

William & Mary has had an honor code since at least 1779. Academic integrity is at the heart of the university, and we all are responsible for upholding the ideals of honor and integrity. The student-led honor system is responsible for resolving any suspected violations of the Honor Code, and I will report all suspected instances of academic dishonesty to the honor system. The *Student Handbook* (**www.wm.edu/studenthandbook**) includes your responsibilities as a student and the full Code. Your full participation and observance of the Honor Code is expected. To read the Honor Code, see **www.wm.edu/honor**.

3.6. Writing Resource Center

The Writing Resources Center, located on the first floor of Swem Library, is a free service provided to W&M students. Trained consultants offer individual assistance with writing, presentation, and other communication assignments across disciplines and at any stage, from generating ideas to polishing a final product. To make an appointment, visit the WRC webpage www.wm.edu/wrc.

3.7. Final Paper

The course's capstone paper will provide you an opportunity to provide an empirical econometric analysis of a topic of your choosing.

The paper is to be approximately 10 pages long and formatted in a way that will allow for its submission to an academic journal. Students must follow the formatting guidelines presented precisely.

The paper is due on Friday, April 26th. The following milestones will help students to develop their thesis and write the paper.

Topic: Paper title and 250 word summary
Friday, March 29, 2019

Data and Literature Review: 2 page discussion of the data sources and summary statistics for the data
Friday April 5, 2019

Rough Draft and in-class peer-reviewed discussion
Friday April 12, 2019

Final Paper: Friday, April 26, 2019

4. Other important notes

4.1 Daily class operation

You will develop professional habits of mind and get the most out of class by doing these things.

The night before class:

- Do the readings. Even skimming the relevant pages for 15 minutes will be worth it. Do not expect to understand the material after only one read.
- Check Blackboard for files to download for class. Download handouts, data sets, and Stata .do files.
- Charge your laptop battery. Unfortunately, outlet power is not always conveniently located in our classroom, so don't rely on plugging in your machine during class.

At the beginning of each class before lecture begins:

- Arrive on time and quietly take your seat if you are late.
- Have Stata running on your laptop computer or be sitting next to someone who does.
- Close your email and Internet entertainment and disable all other electronic distractions.

During class:

- Ask questions when you do not understand something.
- Do not attend to email, the Internet, or other electronic distractions, including phones.

4.2 Appropriate use of computers in class

As section 4.1 suggests, your laptops will be powerful educational tools for this class. However, do not let them or other electronic devices distract you, your fellow classmates, or me from our in-class work. Students who use electronic devices in class inappropriately suggest that they possess neither the intellectual focus nor the respect for others needed to do real professional work. Those students end up developing reputations that make it difficult for faculty members to give them strong recommendations to other professors and future employers.

5. Course Topics

We will adjust this schedule as needed. Any changes to assignment or exam due dates will provide you with more time, not less time, to complete the work. You will notice that the reading assignments repeat for some days. That is intentional because re-reading certain pages in a new context will help to deepen your understanding of prior concepts while establishing new ones.

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1. Estimation and Interpretation of the Linear Regression Model

   (a) Simple Regression and Multiple Regression
   (b) Hypothesis Testing: Test of Single Hypotheses, Test of Multiple Hypotheses
   (c) Functional Form
   (d) Qualitative Information

2. Specification of the Linear Regression Model

   (a) Model Specification
   (b) Model Diagnostic and Remediation: Heteroskedasticity, Serial Correlation

3. Identification of the Linear Regression Model

   (a) Panel Data Models
   (b) Two Stage Least Squares

Week	Day	Description	Topic	Readings	Assignments
Week 1	Wednesday, January 16, 2019	Undergraduate classes begin	Introduction, course overview and tour of the blackboard course page		
	Friday, January 18, 2019		The Simple Regression Model: Overview	Chapter 2: 2.1	
Week 2	Monday, January 21, 2019	MLK Holiday			
	Wednesday, January 23, 2019		Deriving the Ordinary Least Squares (OLS) Estimator	Chapter 2: 2.2	
	Friday, January 25, 2019		Properties of OLS on Any Sample of Data	Chapter 2: 2.3	Assignment 1
Week 3	Monday, January 28, 2019	Add/drop period ends	Units of Measurement and Functional Form	Chapter 2: 2.4	
	Wednesday, January 30, 2019		Expected Value of the OLS Estimator	Chapter 2: 2.5	
	Friday, February 1, 2019		Variance of the OLS Estimator	Chapter 2: 2.5	
Week 4	Monday, February 4, 2019		The Multiple Regression Model	Chapter 3: 3.1, 3.2, 3.3, 4.6	
	Wednesday, February 6, 2019				
	Friday, February 8, 2019		Tests of Single Hypotheses and Confidence Intervals	Chapter 3: 3.4; Chapter 4: 4.1, 4.2, 4.3	Assignment 2
Week 5	Monday, February 11, 2019				
	Wednesday, February 13, 2019		Tests of Single Hypotheses and Confidence Intervals	Chapter 3: 3.4; Chapter 4: 4.1, 4.2, 4.3	
	Friday, February 15, 2019		Testing Hypotheses about a Single Linear Combination of Parameters	Chapter 4: 4.4	Assignment 3
Week 6	Monday, February 18, 2019				
	Wednesday, February 20, 2019				
	Friday, February 22, 2019	Test 1			
Week 7	Monday, February 25, 2019		Testing Multiple Linear Restrictions: The F Test	Chapter 4: 4.5	
	Wednesday, February 27, 2019		More on Functional Form: Quadratics and Interaction Terms	Chapter 6: 6.2	
	Friday, March 1, 2019		Testing Multiple Linear Restrictions: The F Test	Chapter 4: 4.5, 9.1	Assignment 4
Week 8	Monday, March 4, 2019	Spring Break			
	Wednesday, March 6, 2019	Spring Break			
	Friday, March 8, 2019	Spring Break			Assignment 5
Week 9	Monday, March 11, 2019		Multiple Regression Analysis with Qualitative Information	Chapter 7: 7.1, 7.2, 7.3	
	Wednesday, March 13, 2019		Qualitative Information: Interaction Terms and the Chow Test	Chapter 7: 7.4	
	Friday, March 15, 2019	Last day to withdraw from a course	Qualitative Information: Interaction Terms and the Chow Test	Chapter 7: 7.4	Assignment 6
Week 10	Monday, March 18, 2019		Heteroskedasticity: Consequences and Testing	Chapter 8: 8.1, 8.2, 8.3	
	Wednesday, March 20, 2019		Heteroskedasticity: Consequences, Testing and Correction	Chapter 8: 8.1, 8.2, 8.3	
	Friday, March 22, 2019		Heteroskedasticity: Corrective Measures for Heteroskedasticity	Chapter 8: 8.4	Assignment 7
Week 11	Monday, March 25, 2019		Regression Analysis with Time Series Data	Chapter 10: 10.1, 10.2	
	Wednesday, March 27, 2019		Time Series Analysis: Unit Roots	Chapter 18: 18.2	
	Friday, March 29, 2019		Time Series Analysis: Cointegration	Chapter 18: 18.4	Assignment 8
Week 12	Monday, April 1, 2019		Serial Correlation: Consequences and Testing	Chapter 12: 12.2	
	Wednesday, April 3, 2019		Serial Correlation: Corrective Measures	Chapter 12: 12.3	
	Friday, April 5, 2019		ARCH Models for volatility	Chapter 12: 12.6	Assignment 9
Week 13	Monday, April 8, 2019	Test 2			
	Wednesday, April 10, 2019				
	Friday, April 12, 2019				
Week 14	Monday, April 15, 2019		Panel Data Models	Chapter 13	
	Wednesday, April 17, 2019		Panel Data Models: Fixed Effects	Chapter 14: 14.1	
	Friday, April 19, 2019		Panel Data Models: Random Effects and the Hausman Test	Chapter 14: 14.2	Assignment 10
Week 15	Monday, April 22, 2019		Two-stage Least Squares		
	Wednesday, April 24, 2019		Two-stage Least Squares		
	Friday, April 26, 2019	Undergraduate classes end			
	Monday, April 29, 2019	Exam Days			
	Wednesday, May 1, 2019	Exam Days			
	Thursday, May 2, 2019	Exam Days	FINAL EXAM		