

The College of William and Mary

ECON 308: Econometrics

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Course meetings: Tyler Hall 113, MWF 12:00 – 12:50
Office hours: Friday 1:00 PM – 2:00 PM, MW, by appointment

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, November 8, 2019
Data and Literature Review:	2 page discussion of the data sources and summary statistics for the data	Monday November 18, 2019
Rough Draft and in-class peer-reviewed discussion		Friday December 6, 2019
Final Paper:		Friday, December 13, 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.

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

Date	Topics	Reading	Assignments	Note
Wednesday, August 28, 2019	Introduction, course overview and tour of the blackboard course page			First Day of Class
Friday, August 30, 2019	The Simple Regression Model: Overview	Chapter 2: 2.1		
Monday, September 2, 2019	Deriving the Ordinary Least Squares (OLS) Estimator	Chapter 2: 2.2	A1	
Wednesday, September 4, 2019	Properties of OLS on Any Sample of Data	Chapter 2: 2.3		
Friday, September 6, 2019	Units of Measurement and Functional Form	Chapter 2: 2.4		Last day to add/drop
Monday, September 9, 2019	Expected Value of the OLS Estimator	Chapter 2: 2.5	A2	
Wednesday, September 11, 2019	Variance of the OLS Estimator	Chapter 2: 2.5		
Friday, September 13, 2019	The Multiple Regression Model	Chapter 3: 3.1, 3.2, 3.3, 4.6		
Monday, September 16, 2019	Tests of Single Hypotheses and Confidence Intervals	Chapter 3: 3.4; Chapter 4: 4.1, 4.2, 4.3	A3	
Wednesday, September 18, 2019	Tests of Single Hypotheses and Confidence Intervals	Chapter 3: 3.4; Chapter 4: 4.1, 4.2, 4.3		
Friday, September 20, 2019	Testing Hypotheses about a Single Linear Combination of Parameters	Chapter 4: 4.4		
Monday, September 23, 2019	Testing Multiple Linear Restrictions: The F Test	Chapter 4: 4.5	A4	
Wednesday, September 25, 2019	Testing Multiple Linear Restrictions: The F Test	Chapter 4: 4.5, 9.1		
Friday, September 27, 2019	More on Functional Form: Quadratics and Interaction Terms	Chapter 6: 6.2		
Monday, September 30, 2019				The Jewish New Year
Wednesday, October 2, 2019			Test 1	
Friday, October 4, 2019				
Monday, October 7, 2019	Multiple Regression Analysis with Qualitative Information	Chapter 7: 7.1, 7.2, 7.3		
Wednesday, October 9, 2019				Day of Atonement
Friday, October 11, 2019	Qualitative Information: Interaction Terms and the Chow Test	Chapter 7: 7.4		
Monday, October 14, 2019				Fall Break
Wednesday, October 16, 2019	Heteroskedasticity: Consequences, Testing and Correction	Chapter 8: 8.1, 8.2, 8.3	A5	Classes resume from Fall Break
Friday, October 18, 2019	Heteroskedasticity: Corrective Measures for Heteroskedasticity	Chapter 8: 8.4		

Monday, October 21, 2019				Shmini Atzeret
Wednesday, October 23, 2019	Regression Analysis with Time Series Data	Chapter 10: 10.1, 10.2	A6	
Friday, October 25, 2019	Serial Correlation: Consequences, Testing and Corrective Measures	Chapter 12: 12.2, 12.3		Last day to withdraw from a full-term course
Monday, October 28, 2019	ARCH Models for volatility	Chapter 12: 12.6		
Wednesday, October 30, 2019	Time Series Analysis: Unit Roots	Chapter 18: 18.2		
Friday, November 1, 2019	Time Series Analysis: Cointegration	Chapter 18: 18.4	A7	
Monday, November 4, 2019				
Wednesday, November 6, 2019				Test 2
Friday, November 8, 2019				
Monday, November 11, 2019	Panel Data Models	Chapter 13	A8	
Wednesday, November 13, 2019	Panel Data Models: Fixed Effects	Chapter 14: 14.1		
Friday, November 15, 2019	Panel Data Models: Random Effects and the Hausman Test	Chapter 14: 14.2		
Monday, November 18, 2019	Two-stage Least Squares	Chapter 15: 15.1, 15.2, 15.3	A9	
Wednesday, November 20, 2019	Two-stage Least Squares	Chapter 15: 15.5		
Friday, November 22, 2019	Two-stage Least Squares	Chapter 16: 16.1, 16.2, 16.3		
Monday, November 25, 2019				A10
Wednesday, November 27, 2019				Thanksgiving Break
Friday, November 29, 2019				Thanksgiving Break
Monday, December 2, 2019	Logit and Probit Models	Chapter 17: 17.1		Classes resume from Thanksgiving Break
Wednesday, December 4, 2019	Logit and Probit Models	Chapter 17: 17.1		
Friday, December 6, 2019				Last day of classes #WMLDOC