

ECON 308: Econometrics (Spring 2025)

College of William & Mary

Department of Economics

Professor: Tate Twinam
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Office: Chancellors Hall 250

Course Meetings: MWF 11:00-11:50am
Room: Boswell Hall 102
Office Hours: W 4:30-5:30pm

Course Description:

This course will cover the fundamental tools used in modern empirical economic analysis. We will develop the workhorse linear regression model and learn how to apply it to real data sets. We will discuss both descriptive and predictive analysis, and for the latter, we will develop model validation and selection tools with the goal of improving the accuracy of our predictions. We will also discuss methods for applying regression analysis to causal inference, a fundamental problem in human inquiry. This course is essential preparation for advanced work in both micro and macroeconomics, and is highly recommended for anyone who intends to pursue upper level coursework or graduate training in related fields such as public policy, finance, accounting, operations, or computer science.

Prerequisites:

ECON 101; ECON 102; ECON 307 or MATH 106 or BUAD 231 or MATH 351 or SOCL 353.

Tentative Schedule and Topic List:

Wednesday, January 22	Syllabus & probability review	
Friday, January 24	Probability review	
Monday, January 27	Statistical theory	Assignment 1 posted
Wednesday, January 29	Statistical theory	
Friday, January 31	Statistical theory	
Monday, February 3	Simple linear regression	
Wednesday, February 5	Simple linear regression	
Friday, February 7	Simple linear regression	Assignment 1 due, 2 posted
Monday, February 10	Simple linear regression	
Wednesday, February 12	Stata & IPUMS	
Friday, February 14	Stata & IPUMS	Assignment 2 due
Monday, February 17	Multiple linear regression	
Wednesday, February 19	Multiple linear regression	
Friday, February 21	Midterm 1	
Monday, February 24	Multiple linear regression	Assignment 3 posted
Wednesday, February 26	Multiple linear regression	
Friday, February 28	Multiple linear regression	
Monday, March 3	Inference & asymptotic theory	
Wednesday, March 5	Inference & asymptotic theory	
Friday, March 7	Inference & asymptotic theory	Assignment 3 due

Monday, March 10	Spring Break	
Wednesday, March 12	Spring Break	
Friday, March 14	Spring Break	
Monday, March 17	Heteroskedasticity	Assignment 4 posted
Wednesday, March 19	Model validation	
Friday, March 21	Model validation	
Monday, March 24	Variable selection	
Wednesday, March 26	Variable selection	
Friday, March 28	Midterm 2	Assignment 4 due
Monday, March 31	Occupational income scores	Assignment 5 posted
Wednesday, April 2	Hedonic regression	
Friday, April 4	Hedonic regression	
Monday, April 7	Rubin potential outcomes model	
Wednesday, April 9	Rubin potential outcomes model	
Friday, April 11	Causal graphical models	Assignment 5 due
Monday, April 14	Selection on observables	
Wednesday, April 16	Differences-in-differences	
Friday, April 18	Differences-in-differences	Assignment 6 posted
Monday, April 21	Differences-in-differences	
Wednesday, April 23	Differences-in-differences	
Friday, April 25	Differences-in-differences	
Monday, April 28	Instrumental variables	
Wednesday, April 30	Instrumental variables	
Friday, May 2	Instrumental variables	Assignment 6 due

Important Dates:

Friday, January 31	Last day to add/drop
Monday, March 24	Last day to withdraw/elect for pass/fail
Wednesday, May 7	Final exam 10am-12pm

Required Software:

The official software for this course is Stata, which is available on the campus PACLab computers. You can access these computers in person or remotely; to gain remote access, use the virtual desktop infrastructure described here: <https://www.wm.edu/offices/it/services/network/virtualdesktop/index.php>. NB: If you use Stata on a remote desktop, anything saved to the computer will be deleted after you log out. So, make sure to back everything up to a personal drive, or email anything you'd like to keep (such as a do-file) to yourself. Also, if you open this document in a proper PDF reader (such as Adobe Acrobat), rather than a web browser, all URLs are clickable links.

If you would like your own copy of Stata, you can purchase a discounted copy here: <https://www.wm.edu/offices/it/services/software/licensedsoftware/mathstats/stata/index.php>. The Stata/IC version will be fine for this class. If you have experience with R, you are welcome to use that instead, just let me know.

Optional Textbooks:

Wooldridge, Introductory Econometrics: A Modern Approach (standard undergraduate text)

Angrist and Pischke, Mastering 'Metrics or Mostly Harmless Econometrics (easy introduction to causal inference)

James, Witten, Hastie, and Tibshirani, An Introduction to Statistical Learning

<https://statlearning.com/> (free text, standard introduction to machine learning)

Cunningham, Causal Inference: The Mixtape

<https://mixtape.scunning.com/> (free text, more advanced, covers most of what we cover)

Evaluation Policy:

You are responsible for attending lectures, taking notes, and reviewing your notes after each class. If you miss class, you are responsible for obtaining notes from another student. Evaluations will be based on three exams and six assignments. Midterms 1 & 2 will each be worth 15% of your grade. The final exam will be worth 25% of your grade. Exams will be monitored and any student caught cheating will receive a failing grade. Each assignment will be worth 7.5% of your grade. Discussing the assignments with your peers is permitted and encouraged. However, you must complete the assignments (including coding) individually - all work you turn in should be your own.

Assignments will be due in class (in hard copy form) on the date specified on the assignment. A 30% grade penalty will apply to assignments not turned in before the Monday following the specified date. Assignments will not be accepted by email; late assignments can be put under the door to my office.

If you cannot attend an exam due to documented college business or religious observance, you must notify me and schedule a make-up exam at least two weeks in advance. All other make-up exams required for any reason will incur an automatic 20% grade penalty.

Your final letter grade will be determined according to the following intervals:

A	[93-100]	C	[73-77)
A-	[90-93)	C-	[70-73)
B+	[86-90)	D+	[67-70)
B	[83-86)	D	[63-67)
B-	[80-83)	D-	[60-63)
C+	[77-80)	F	[0,60)

These are strict and apply to all students.

Syllabus Revisions:

You are responsible for all materials, updates, and announcements covered during class sessions. The course schedule may change over time due to unforeseen circumstances. I expect you to monitor your William & Mary e-mail account regularly so that I can communicate with each of you electronically between classes.

Electronic Device Policy:

Use of cell phones during class is prohibited. Use of laptops or tablets is permitted for note-taking only; do not access the internet during class unless encouraged to as part of a class activity. Casual web browsing, checking email, watching videos, etc. during class greatly inhibits the learning experience. It can also be very distracting for your fellow classmates.

Academic Integrity:

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. Your full participation and observance of the Honor Code is expected. To read the Honor Code, see www.wm.edu/honor.

Student Accessibility Services:

Your experience in this class is important to me, and it is the policy and practice of William & Mary to create inclusive and accessible learning environments consistent with federal and state law. 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 www.wm.edu/sas.

Respect for Diversity:

Diverse backgrounds, embodiments, and experiences are essential to the critical thinking endeavor at the heart of university education. In this classroom, students are expected to:

- Respect individual differences which may include, but are not limited to: age, cultural background, disability, ethnicity, family status, gender identity/presentation, immigration status, national origin, race, religion, sex, sexual orientation, socioeconomic status, and veteran status.
- Engage respectfully in discussion of diverse worldviews and ideologies embedded in course readings, presentations, and artifacts, including those course materials that are at odds with personal beliefs and values.

Parenting Student Resources:

Pregnant and parenting students are encouraged to take advantage of the resources provided on campus; information about these resources can be found at https://www.wm.edu/offices/compliance/title_ix_coord/pregnancy/index.php. You are also welcome to confidentially discuss your pregnancy/parenting status with me if you feel it would help me to help you make the most of your time here.

For Our Veterans:

If you are a student who has served in our nation's military forces, welcome home, and thank you for your service. I hope that you feel comfortable enough to confidentially self-identify yourself to me so that I can help you make a successful transition from the military to higher education. We at William & Mary understand that the transition into civilian life can be challenging for our veteran students, and we provide resources for any who may want to reach out for guidance or assistance in these matters. Please contact Veteran Services at vabenefits@wm.edu.

Mandatory Reporting:

William & Mary faculty are required by law to report any information they receive pertaining to sexual misconduct or assault. As a mandatory reporter, any disclosures to me of this nature will have to be further disclosed to the Title IX coordinator on campus. This is not to discourage you from discussing these issues with me; you are welcome to do so. However, if you have issues or concerns regarding yourself or someone else, and would like to share them confidentially, you are strongly encouraged to contact The Haven, a peer-based confidential resource center for those impacted by sexual violence and harassment, relationship violence, stalking, and other gender-based discrimination. They are located at Campus Center 166 and can be reached by email (thehaven@wm.edu) or phone (757-221-2449). You can find more information at <https://www.wm.edu/offices/thehaven/index.php>.

Care Support Services:

The Dean of Students Office provides Care Support Services to students in need. If you are facing challenges to your mental, physical, and/or social health, you are strongly encouraged to contact them by email (care@wm.edu) or phone (757-221-2511). If you are concerned that a fellow student may be facing physical, emotional, or academic difficulties, you can also contact CSS on their behalf (confidentially and anonymously if you wish). You can find more information at <https://www.wm.edu/offices/deanofstudents/services/caresupportservices/index.php>.

Inclement Weather:

Note that the campus may be closed due to weather. Information on suspension of operations will be made public and available through the media. Students can learn of campus operations status from the website. You may also sign up with an alert system through Banner that will contact you via email or text message if classes are canceled. Class activities will be rescheduled as needed.

Additional Support Services:

- Campus Libraries: <https://www.wm.edu/academics/libraries/>.
- Tribe TutorZone: <https://www.wm.edu/offices/deanofstudents/services/academicenrichment/tutors/>.
- Cohen Career Center: <https://www.wm.edu/offices/career/>, 757-221-3231.
- Student Counseling Services: <https://www.wm.edu/offices/wellness/counselingcenter/index.php>, 757-221-3620.
- National Suicide Prevention Lifeline: Dial 988.