AAE 636 APPLIED ECONOMETRIC ANALYSIS I (FALL 2022)
LECTURE – TUES/THURS 1-2:15PM: *RUSSELL LAB 150*
DISCUSSION – FRI 8:50-9:40AM: *RUSSELL LAB 150*

INSTRUCTOR

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CREDIT HOUR DETERMINATION:

This is a 3-credit course. This class meets for two 75-minute class periods each week over the fall semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc.) for about 3 hours out of classroom for every class period. The syllabus includes more information about meeting times and expectations for student work.

CAPSULE STATEMENT

This course will introduce the basic econometric methods associated with linear models. Students will become familiar with the technical aspects of linear regression and statistical inference and will learn how these methods are used for contemporary applied research. The course will function both as a stand-alone introduction to linear models and a point of departure for studying more advanced techniques.

LEARNING OBJECTIVES

Our examination of the linear model will focus on the conceptual properties of estimators, the use of software packages such as Stata and R to estimate linear models and understanding how linear models can help us distinguish between associative and causal relationships between variables. Students will obtain working knowledge of ordinary least squares, instrumental variables, and some panel models; they will also learn how to gauge the appropriateness of different model assumptions for different types of applied problems. More generally, students will learn how to both recover and critically evaluate estimates from linear models

PREREQUISITES

Students should have completed undergraduate courses in derivative calculus and intermediate microeconomics, and an upper-level statistics course. Computer programming skills are not necessary, but students should be comfortable with basic computer usage as well as the manipulation of data in Excel. We will be learning and making use of the analysis software packages Stata and/or R, and so students should arrange access to these programs on their personal machines or in university computer labs.

TEXTBOOKS AND SOFTWARE

I will assign readings out of the following books:

Wooldridge, Jeffrey, 2019. *Introductory Economics: A Modern Approach*, 7th edition, Cengage (W).

For reference, I also find the following books useful:

Cameron and Trivedi, 2010. *Microeconometrics Using Stata*, revised edition, Stata Press.

Angrist, J. and J. Pischke, 2009. *Mostly Harmless Econometrics*, Princeton University Press.

Angrist, J. and J. Pischke, 2015. *Mastering 'Metrics: The Path from Cause to Effect*, Princeton University Press (AP).

The 5th or 6th editions of the Wooldridge book will also work. The course will follow Wooldridge topically so please make sure you secure a copy. I will assign auxiliary readings from Angrist and Pischke (2015).

The course will include several applied homework assignments. I will provide instruction and assistance in Stata, and Danjing will be responsible for doing so in R. If you are unsure about which software to use I suggest beginning with Stata.

ASSESSMENT

Your course grade will be based on your performance on two midterms and one final exam, as well as several homework assignments. The percentages are as follows:

Midterm Exams	40 percent (20 percent each)
Cumulative Final Exam	30 percent
Homework Assignments	30 percent

The following are ***tentative*** dates for the midterm exams, and a ***firm*** date for the final exam:

Exam 1 – Thursday 13 October
Exam 2 – Thursday 17 November
Final Exam – Wednesday 21 December 2:45pm

Homework assignment will include a mixture of analytical and applied exercises; I expect there will be 6 assignments.

Tentative homework due dates (I will almost certainly make changes depending on the pace of material coverage):

HW1 – 9/27
HW2 – 10/6
HW3 – 11/1
HW4 – 11/10
HW5 – 12/1
HW5 – 12/13

GRADING

I will determine your grades based on the following percentages, which will arise from the numerical scores I assign to each of the components:

$\geq 93\%$	A
$< 93\% \ \& \geq 88\%$	AB
$< 88\% \ \& \geq 83\%$	B
$< 83\% \ \& \geq 78\%$	BC

< 78% & ≥ 70%	C
< 70% & ≥ 60%	D
< 59%	F

CLASS FORMAT

Most of the class time will be lecture-based, but I want to encourage your active participation. Please ask questions and respond to my queries! I will also design classroom exercises to get you actively engaged in discussing the material. Please plan to participate.

I will use a combination of handouts and board presentations. Any needed handouts will be posted by 8am the day of the lecture, so please plan to check the Canvas site for material. In general, I will use the Canvas site for posting materials and emailing information, so you should plan to interact with the site regularly. Also, I plan to organize our class to use of Piazza for group discussions.

Friday AM labs will be scheduled most weeks. Danjing will usually lead these; activities might include going over homework assignments, discussions on using R or Stata, and reviewing. Details on these will be forthcoming. ***On some occasions I will use the labs for makeup lectures – I travel somewhat frequently and may need to cancel a lecture here or there.***

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to https://conduct.students.wisc.edu/academic-integrity/

ACCOMMODATIONS OF STUDENTS WITH DISABILITIES

***McBurney Disability Resource Center syllabus statement*:** "The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA." http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php

DIVERSITY AND INCLUSION

***Institutional statement on diversity*:** "Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world." https://diversity.wisc.edu/

OUTLINE OF TOPICS, READINGS, AND APPROXIMATE TIMING

Class	Topic	Reading
9/8	Syllabus	W: 1; AP: intro, 1
Statistical Review		
9/13	Introduction/random variables	W: 1, Appendix B
9/15	Random variables/mathematical statistics	W: Appendix B, C
9/20	Cont. math stats/simple regression function	W: Appendix C, 2.1
Simple (Two Variable) Regression		
9/22	Ordinary least squares (OLS)	W: 2.2
9/27	Properties of OLS estimator	W: 2.3, 2.5
9/29	Properties/Algebra of OLS	W: 2.3, 2.5
10/4	Functional form	W: 2.4
10/6	Wrap up simple OLS	
Multiple Regression		
10/11	Multivariate OLS model/assumptions	W: 3.1, 3.2
10/13	Exam 1	
10/18	Properties OLS estimator	W: 3.3-3.5
10/20	Inference/hypothesis testing	W: 4.2-4.4
10/25	F-tests/Asymptotic properties	W: 4.5, 5.1-5.3
10/27	Asymptotic properties cont.	W: 5.1-5.3
11/1	Dummy variables	W: 7.1-7.2; AP: 2
11/3	Dummy variables/large numbers of ‘fixed effects’	W: 7.3-7.4
11/8	Binary dependent variables	W: 7.5
11/10	Wrap up multiple regression	
Assumption Violations		
11/15	Heteroskedasticity	W: 8.1-8.3
11/17	Exam 2	
11/22	Cluster robust standard errors	TBD
11/29	Measurement error	W: 9.4
Other models		
12/1	Pooled cross sectional data	W: 13.1, 13.2
12/6	Difference in differences/two period panel data	W: 13.3, 13.4; AP: 5
12/8	Fixed effects model	W: 14.1
12/13	Instrumental variables	W: 15.1-15.4; AP: 3

Please note that I will make updates to the dates of coverage as we move through the semester.