

AAE 636 APPLIED ECONOMETRIC ANALYSIS I (FALL 2018)
LECTURE – TUES/THURS 1-2:15PM: *MECHANICAL ENGINEERING 1156*
DISCUSSION – FRI 8:50AM – 9:40AM: *BIOCHEM 1120*

INSTRUCTOR

Prof. Daniel J. Phaneuf (pronounced *fa-neff*)

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Office Hours: Tuesday 11am – noon, Thursday 2:30pm – 3:30pm, and by appointment.

Ms. Zhidong Chen (TA)

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Office Hours: TBA

CREDIT HOUR DETERMINATION:

This is a 3 credit course. This class meets for two 75-minute class periods each week over the fall/spring 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, 2013. *Introductory Economics: A Modern Approach*, 5th edition, South-Western (W).

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

For reference, I also find the following book useful:

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

The course will include several applied homework assignments. I will provide instruction and assistance in Stata, and Zhidong will be responsible for doing so in R.

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 11 October
Exam 2 – Thursday 15 November
Final Exam – Saturday 15 December

Homework assignment will include a mixture of analytical and applied exercises; I expect there will be ~7-8 assignments.

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 |
| $< 78\% \ \& \ \geq 70\%$ | C |
| $< 70\% \ \& \ \geq 60\%$ | 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.

Friday AM labs will be scheduled most (but not all) weeks. Zhidong 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

| <u>Topic</u> | <u>Reading</u> | <u>Week</u> |
|---|-----------------------|--------------------|
| Introduction | W 1; AP 1, 2 | 1 |
| Random variables | W appendix B | 1, 2 |
| Mathematical statistics | W appendix C | 2, 3 |
| Simple linear regression model | W 2; AP 3.1.1, 3.1.2 | 3, 4, 5 |
| Multiple linear regression: | | |
| Estimation | W 3; AP 3.2 | 5, 6 |
| Inference | W 4, 5; AP 3.1.3 | 7, 8 |
| Binary variables | W 7; AP 3.1.4, 3.4.2 | 9, 10 |
| Robust and cluster robust standard errors | W 8, AP 8.2.1, TBA | 11, 12 |
| Miscellaneous topics | W 9.4; TBA | 12, 13 |
| Panel data models | | |
| Basic panel models | W 13; AP pp. 221-233 | 12, 13 |
| Advanced panel models | W 14 | 14 |
| Instrumental variables | W 15; AP pp. 113-127 | 15, 16 |