

AAE 636: APPLIED ECONOMETRIC ANALYSIS I
DEPT. OF AGRICULTURAL AND APPLIED ECONOMICS
UNIVERSITY OF WISCONSIN - MADISON
FALL 2019

INSTRUCTOR: Sarah Johnston

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CREDITS: This is a 3 credit course.

LECTURES: Tuesdays and Thursdays, 1:00 pm - 2:15 pm in Babcock Hall 119. This three credit course has two 75 min lectures per week. Students are expected to work approximately 6 hours outside class to complete assignments and learn the relevant material.

LABS: Fridays, 9:00 am - 10:00 am in Engineering Hall 1213. Labs will meet every week except the week of Thanksgiving (11/29), and the two Fridays after the midterm exams (10/4 and 11/8). Sunny will lead labs. Activities might include going over homework assignments, discussions on using R or Stata, and reviewing.

INSTRUCTIONAL MODE: Face-to-face.

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.

PREREQUISITES: Students should have completed undergraduate courses in derivative calculus and intermediate microeconomics, and an upper level statistics course.

TEXTBOOKS AND SOFTWARE: I will assign readings out of the following books:

- Wooldridge, Jeffrey, 2013. *Introductory Econometrics: A Modern Approach*, 5th edition, South-Western (W)
- Angrist, J. and J. Pischke, 2009. *Mostly Harmless Econometrics*, Princeton University Press (AP)

The course will include several applied homework assignments. You may use either R or Stata for these assignments. Sunny will be responsible for providing instruction and assistance in R.

COURSE WEBSITE: All course material will be posted on Canvas. Link: <https://canvas.wisc.edu/courses/152966>

EMAIL: Please include “636” in the subject.

CLASS FORMAT: Most of the class time will be lecture-based, but I want to encourage your active participation. You are encouraged to ask questions in class. Almost always, another student will have the same question or find the same explanation unclear. Please be considerate of your classmates by not emailing, texting, or surfing the internet during class time.

ASSIGNMENTS: There will be six homework assignments, with the due date given at the top of each assignment. **Assignments must be submitted in class, at the beginning of class.** Should circumstances arise where you need to turn in a problem set late, you must contact both the instructor and the TA by email **before** the assignment is due unless you are physically unable to do so. **Collaboration is encouraged, but assignments must be written up individually.** No credit will be given for identical assignments.

EXAMS: There will be three exams during the semester, two midterm exams administered in class, and one final exam administered during the University’s exam period. The dates are as follows:

- Midterm 1: Thursday, 10/3/2019, in class
- Midterm 2: Thursday, 11/7/2019, in class
- Final Exam: Wednesday, 12/18/2019, 2:45-4:45

If you cannot take the exams at these times, do not take this course. If you are entitled to testing accommodations from the McBurney Resource Center, you must submit your McBurney VISA to me by October 8, 2019. Any student who has not done so by that date will not be eligible for extra time or other accommodations during examinations.

Valid reasons for missing an exam are limited to serious illnesses and family emergencies, and you will be required to provide supporting documentation. If a student has a valid reason for missing the midterm exam, there will be no make-up offered at an alternative time: the weight for the midterm exam will be placed proportionally on the other midterm and the final exam. If a student has a valid reason for missing the final, we can arrange a special date and time for a make-up exam.

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:

30%: Problem Sets

40%: Midterm exams (20 percent each)

30%: Final exam

I will assign letter grades based on total score at the end of the course. I plan to use the following cutoffs:

$\geq 92\%$	A
$\geq 88\% \ \& \ < 92\%$	AB
$\geq 82\% \ \& \ < 88\%$	B
$\geq 78\% \ \& \ < 82\%$	BC
$\geq 70\% \ \& \ < 78\%$	C
$\geq 60\% \ \& \ < 70\%$	D
$< 60\%$	F

I reserve the right to adjust these cutoffs downward; they will not be adjusted upward.

ACKNOWLEDGEMENTS: Material in this course is adapted from similar courses taught by Daniel Phaneuf, Melvin Stephens, and Eric Chyn.

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 FOR STUDENTS WITH DISABILITIES: 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 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. I will work either directly with 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.

DIVERSITY & INCLUSION: 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.

TENTATIVE COURSE SCHEDULE

Class	Approximate topic	Reading
9/5	Introduction	W:1 AP: 1,2
I. STATISTICAL REVIEW		
9/10	Random Variables	W: Appendix B
9/12	Random Variables, Mathematical Statistics	W: Appendices B, C
9/17	Mathematical Statistics	W: Appendix C
II. SIMPLE (TWO VARIABLE) REGRESSION		
9/19	Simple Regression Function; OLS	W: 2.1, 2.2 AP: 3.1.1-3.1.2
9/24	Properties, Assumptions, Unbiasedness, Variance	W: 2.3, 2.5, 3.5
9/26	Normality; Hypothesis Testing; Prediction	W: 4.1-4.3, 6.4
10/1	R ² ; Asymptotic Properties; ML; MoM	W: 2.3, 5.1-5.3
10/3		EXAM 1
III. MULTIPLE REGRESSION		
10/8	Assumptions, Unbiasedness, Interpretation	W: 3.2-3.3 AP: 3.2
10/10	OLS Variance, Misspecification, Gauss-Markov	W: 3.3-3.4
10/15	Inference, Hypothesis Testing, F-Tests	W: 4.2, 4.4
10/17	F-tests, Multicollinearity, Asymptotic Properties	W: 3.4, 4.4, 5.2 AP: 3.13
10/22	Elasticity, Reciprocal, Higher Order Terms	W: 2.4, 6.2
10/24	Dummy Variables	W: 7.1, 7.2 AP: 3.1.4, 3.4.2
10/29	Dummy Variables, Difference-in-Differences	W: 7.3, 7.4
VI. SOME ASSUMPTION VIOLATIONS		
10/31	Heteroskedasticity	W: 8.1, 8.2
11/5	Heteroskedasticity; Clustering	AP: 8.21
11/7		EXAM 2
11/12	Pooled Cross Sections, Two period panel	W: 13.1, 13.2, 13.3, 13.4
11/14	Fixed Effects	W: 14.1
11/19	Fixed Effects	AP: 5.1
11/21		NO CLASS
11/26	Differences-in-Differences revisited	AP: 5.2
12/3	Measurement error	W: 9.4
12/5	Instrumental Variables	W: 15.1-15.4
12/10	Instrumental Variables	AP: 4.1
12/12	Regression Discontinuity	AP: 6

ASSIGNMENT DUE DATES (SUBJECT TO CHANGE)

ASSIGNMENT	TENTATIVE DUE DATE
1	Tuesday, September 17, 2019
2	Tuesday, October 1, 2019
3	Tuesday, October 15, 2019
4	Tuesday, October 29, 2019
5	Tuesday, November 26, 2019
6	Tuesday, December 10, 2019