Applied Econometrics (Econ 322)

Department of Economics
American University

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COURSE DESCRIPTION:

This course provides an introduction to the techniques that economists use for estimating and testing hypotheses about economic relationships. Throughout the course, we will focus on two goals: (1) developing an understanding of different econometric models and techniques, including the assumptions on which they are based; (2) learning how to apply these techniques to substantive economic questions.

We will use the statistical software package Stata. Previous knowledge of Stata is not required.

The prerequisites for this course are ECON-100, ECON-200, and STAT-202 or STAT-203. The statistics prerequisite, in particular, is critical to your success in the class and will not be waived for any reason.

STUDENT LEARNING OUTCOMES:

After completing this course, students should be able to:

1. Explain using verbal descriptions and mathematics how to specify, estimate, and interpret a linear regression model.
2. Explain the assumptions underlying the regression model.
3. Conduct and interpret hypothesis tests and related statistical tests for the regression model.
4. Answer empirical questions by applying econometric techniques to real-world data sources using Stata.
5. Explain, and critically analyze basic econometric work done by others.

GRADING:

Your grade will be based on the following components, with weights in parenthesis:

- Three in Class Exams (65% total)
- Final Exam (35%)

The *minimum* numerical average needed to attain each letter grade for the course is as follows:

	Grading Scale									
Average	< 60	$60-69$	$70-72$	$73-76$	$77-79$	$80-82$	$83-86$	$87-89$	$90-92$	≥ 93
Grade	F	D	C-	C	C+	B-	B	B+	A-	A

However, final grades will very likely be curved. The grading scale above ensures that your grade will never be "curved down." For example, a final average of 91 will earn *at least* an $A-$.

Problem Sets:

Periodically, I will post problem sets, along with solutions, on Blackboard. These assignments will provide valuable hands-on practice working with the models and methods covered during the course. Mastering these assignments is the best way to ensure that you perform well on exams.

Exams:

The in class exams are scheduled for **2/14/2019**, **3/25/2019**, and **4/22/2019**, during the normal class meeting time. The final exam is scheduled for a date and time determined by the registrar.

Policy on Missed Exams:

Short of a **documented** medical emergency or something equally serious, there is no valid excuse for missing an exam. In the event that you do have an excused absence from an exam, your final grade will be based on a re-weighting of your remaining grades. However, if you miss the final exam and have an acceptable justification, a make-up exam will be arranged for you afterwards.

CLASS MEETINGS:

The course will consist of a mixture of lecture and class discussions. Reading the assigned sections of the textbook *before* class will help you get the most out of lectures and discussions. In borderline grading situations, attendance and quality of participation in class discussions will be taken into account.

Note on Cell Phones and Laptops: Cell phones must be turned off once you enter the classroom. Laptops are permitted during class only for taking class notes, but I strongly discourage you from taking notes on a computer. All other activities on a laptop are distracting to others and to the instructor, and therefore are not permitted during class time.

COURSE RESOURCES:

The required textbook is the 5th edition of *Introductory Econometrics* by Jeffrey Wooldridge (2013). Additional materials, such as supplemental notes and journal articles, will be available on Blackboard.

Throughout the semester, we will use the software package Stata. Stata is available in on-campus computer labs and on your personal computer (while either on or off-campus) through the Virtual Computing Lab (VCL). The CTRL Lab located in Hurst 214 provides support for Stata to students on either a drop-in or appointment basis.

If you choose to purchase Stata, as an AU student you can purchase a perpetual or annual license for a discounted price through the Stata GradPlan (Stata Website). For the purposes of this class, I recommend Stata/IC (the least expensive version). Based on past experience, almost all students choose to access Stata through the VCL and do not purchase Stata.

ACADEMIC INTEGRITY:

Standards of academic conduct are set forth in the University's Academic Integrity Code. By registering, you have acknowledged your awareness of the Academic Integrity Code, and you are obliged to become familiar with your rights and responsibilities as defined by the code. Violations of the Academic Integrity Code will not be treated lightly, and disciplinary actions will be taken should violations occur; the standard sanction for violations is failure of the course.

TOPICS AND READING LIST:

The topics and reading list are subject to change, and the current schedule will always be posted on Blackboard. Updates will be announced in class.

1) **Essential Topics in Mathematics, Probability, and Statistics**
   (a) Mathematical Tools (Appendix A)
   (b) Fundamentals of Probability (Appendix B)
   (c) Fundamentals of Mathematical Statistics (Appendix C)
   (d) Introduction to Stata: Descriptive Statistics and Visualizing Data

2) **The Regression Model**
   (a) The Simple Regression Model (Chapter 2)
   (b) Multiple Regression (Chapter 3)

3) **Inference**
   (a) Finite Sample Properties of the OLS estimators (Chapter 4)
   (b) Large Sample Properties of the OLS estimators (Chapter 5)
   (c) Heteroskedasticity (Chapter 8)

4) **Additional Topics in Specifying, Estimating, and Interpreting Regression Models**
   (a) Functional Forms (Chapter 6)
   (b) Qualitative Variables (Chapter 7)
   (c) Interpreting and Presenting Empirical Results
      - Stinebrickner, Ralph, Todd Stinebrickner, and Paul Sullivan. "Beauty, Job Tasks, and Wages: A New Conclusion about Employer Taste-Based Discrimination, Review of Economics and Statistics, forthcoming.
   (d) Endogeneity and Omitted Variable Bias (Chapter 9)
      - Persico, Nicola, Andrew Postlewaite, and Dan Silverman. "The effect of adolescent experience on labor market outcomes: The case of height." Journal of Political Economy 112(5), 2004.

5) **Endogeneity, Instrumental Variables, and Simultaneous Equations**

   (a) Instrumental Variables (Chapter 15)

      - Stinebrickner, Ralph, and Todd R. Stinebrickner. "The causal effect of studying on academic performance." The BE Journal of Economic Analysis & Policy 8(1), 2008.

6) **Additional Topics** (time permitting; to be selected based on class interest)

   (a) Discrete dependent variables

   (b) Panel Data

   (c) Simultaneous Equations

   (d) Experiments and Quasi-experiments

   (e) Examples of empirical research papers