INTERMEDIATE METHODOLOGY
POLI 5003
Spring 2017
Tuesday & Thursday 9:30-10:45 176 SH
Lab Session: Tuesday 2:00-2:50 337 SH

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This course is the third in the quantitative methods sequence in the University of Iowa's political science Ph.D. program. This course introduces students to linear regression models for the analysis of quantitative data and provides a basis of knowledge for more advanced statistical methods. After covering the classic normal linear regression model and its assumptions, we will explore the consequences and remedies for violations of these assumptions, including omitted variables, heteroscedasticity, autocorrelation, and endogeneity. We will also explore the use and interpretation of continuous, ordinal, nominal, and indicator variables as well as interactions between them. If time permits, we will also discuss missing data and basic models for limited dependent variables. Along the way and primarily in the lab session, students will learn the basics of data collection, organization and management; measurement; data visualization and display; and univariate, bivariate and multivariate descriptive statistics.

The course assumes basic math literacy, including familiarity with probability theory, properties of estimators, rudimentary calculus, and linear algebra, as well as mastery of the basic statistics taught in POLI 5001.

REQUIRED TEXTS:
Dougherty, Christopher. 2011. *Introduction to Econometrics, 4th Edition*. New York: Oxford University Press.

Acock, Alan. 2014. *A Gentle Introduction to Stata, 4th Edition*. Stata Press.

COURSE REQUIREMENTS
Homework Assignments (40%)
Roughly weekly homework assignments will be distributed throughout the semester. They require solving mathematical problems, computer exercises, diagnosis and correction of regression assumption violations and applications in advanced topics. In these exercises, it is important to carry out multiple tests (and when possible, go beyond the scope of the lecture) and to discuss carefully the implications of the tests for statistical inference and substantive interpretation. The problem sets are due **in class or in my mailbox a week** from when they are assigned, as specified in each assignment. **Students are allowed to drop one homework assignment during the semester. No late assignments will be accepted.**

Exams (45%):
There will be three in-class exams. Two exams will be administered during the semester and one during finals week. Content of the exams are based on the textbook, course lectures, and the problem sets. Only in extreme circumstances will makeup exams be given.

Replication Paper (15%):
A research project based on a substantive problem in the student's major field of study is required. The project requires the student to **replicate and extend** the data analysis in a published journal article. The replication should produce results as those in the published article. The extension of the data analysis can be one of two forms. One type of extension is to cross validate the data analysis in a larger sample. The sample may be expanded in temporal or cross sectional units, motivated by some theoretical intuition. Another type of

extension is to cross validate the data analysis based on an alternative model specification or estimator. The purpose is to assess the robustness of previous findings in the presence of confounding variables or alternative estimators. The analysis should also be motivated theoretically. More details will be discussed in class after the first exam. The project should have about 10 pages of text. The topic must be chosen in consultation with the instructor. **Papers are due May 11 at noon. No late papers will be accepted.**

Grading
The following grades may be assigned at the end of the class: A+, A, A-, B+, B, B-, C+, C, C-, D+, D, D-, F. I reserve the right to make adjustments to grades based on overall performance in the course. There will be no extra credit or grading curves.

Lab Session
The course has a required lab session each week. During each lab session, we will discuss problems and issues in the weekly homework assignment, programming in STATA, and practice with STATA during each session.

Other Considerations
If you have questions or concerns, please come to my office hours first. Please do not drop by my office with the expectation that we can meet anytime. The best way to get a quick response is through email. I will do my best to promptly answer your emails; however, typically you should not expect a same-day response after 7:00 pm.

I will only respond to emails sent from your UI account.

Please turn off all cell-phones during class. I also discourage the use of laptops in class. Research has consistently shown that retention improves when a student writes notes down, but is not improved by the act of typing things onto a screen. I reserve the right to dismiss you from class if disruptions occur, resulting in an absence for the day.

All additional class materials will be posted to the ICON website.

You are welcome to work together on homework assignments, but you are each expected to write up and turn in your own answers. If you do not understand the homework, you will not do well on the exams. Therefore, copying someone else's work not only constitutes academic misconduct, but it will hurt you on the exams as well.

If you are having difficulties in class or any other problems or concerns arise, please *talk to me first*.

RESOURCES
The **Political Methodology Section** of the American Political Science Association was created to provide APSA members with an interest in political methodology with a forum in which to meet and discuss ideas. The section publishes a quarterly newsletter (*The Political Methodologist*), a quarterly journal on political methodology (*Political Analysis)*, conducts a discussion list on topics relating to political methodology, and maintains an extensive electronic archive of papers, accessible via their homepage (http://polmeth.wustl.edu/)

The **Inter-University Consortium for Political and Social Research (ICPSR)** at the University of Michigan maintains an extensive archive of data in the social and behavioral sciences. Much of it is accessible via their homepage (http://www.icpsr.umich.edu).

The **Stata** homepage (http://www.stata.com) is a valuable resource for questions about Stata statistical software. There are also a number of useful STATA references on the web, including Scott Long's page at IU and an excellent STATA help page sponsored by UCLA.

Harvard University's Dataverse Project "increases scholarly recognition and distributed control for authors, journals, archives, teachers, and others who produce or organize data; facilitates data access and analysis for researchers and students; and ensures long-term preservation whether or not the data are in the public domain."

COURSE OUTLINE

Week 1, January 17 & 19: Course Overview and Review of Basic Concepts
>Dougherty, R2-R8
>**Lab:** Acock, Chapters 1-2

Week 2, January 24 & 26: Basic Concepts, continued
>Doughtery, R9-R13
>**Lab:** Acock, Chapters 3 & 4; Find a dataset in your field that you are interested in using

Week 3, January 31 & February 2: Simple Regression Analysis
>Dougherty, Chapter 1
>**Lab:** Be prepared to talk about potential article for final paper

Recommended:
Lewis-Beck, Michael S. and Andrew Skalaban. 1990. "When to Use R-Squared." *The Political Methodologist* 3(2):11-12.
King, Gary. 1990. "When Not to Use R-Squared." *The Political Methodologist* 3(2):9-11.
Luskin, Robert C. 1991. "R-Squared Encore." *The Political Methodologist* 4(1):21-23.

Week 4, February 7 & 9: Properties of OLS Estimators
>Doughtery, Chapter 2
>**Lab:** Acock, Chapter 5

Week 5, February 14 & 16: Gauss-Markov Theorem & Hypothesis Testing
>Doughtery, 2.6-2.7, Appendix 2.1
>**Lab:** Exam 1 Review Session

Recommended:
Berk, Richard. 2010. "What you Can and Can't Properly Do with Regression." *Journal of Quantitative Criminology* 26 (4): 481-487.

Week 6, February 21 & 23: Multiple Regression Analysis
>**Exam 1, February 21**
>Doughtery, 3.1-3.4
>**Lab:** Zorn's Stupid Regression Tricks

Week 7, February 28 & March 2: Multiple Regression Analysis, continued
>Doughtery, 3.4-3.6
>**Lab:** Acock, Chapter 10

Week 8, March 7 & 9: Nonlinear Models & Transformations of Variables
>Doughtery, 4.1, 4.3
Friedrich, Robert J. 1982. "In Defense of Multiplicative Terms in Multiple Regression Equations." *American Journal of Political Science* 26(November):797-833.
Brambor, Thomas, William R. Clark, and Matt Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14:63-82.
>**Lab:** Practice writing up statistical analyses/Making tables in Excel/Interpreting Interactions

NO CLASS MARCH 14 & 16 SPRING BREAK

Week 9, March 21 & 23: Continous, Nominal, Ordinal, and Dichotomous Variables
    Doughtery, Chapter 5
    Lab: Acock, Chapters 6 & 7

Week 10, March 28 & 30: Specification of Regression Variables
    Doughtery, Chapter 6
    Lab: Review for Exam 2

Week 11, April 4 (NO CLASS April 6 MPSA):
    Exam 2, April 4
    Lab: Work on final paper extensions

Week 12, April 11 & 13: Heteroscedasticity
    Doughtery, Chapter 7
    Lab: Work on final paper extensions

Week 13, April 18 & 20 (NO CLASS April 20 Notre Dame): Measurement Error
    Doughtery, Chapter 8
    Lab: Acocok, Chapter 12

Week 14, April 25 & 27: Binary Outcome Variables
    Doughtery, Chapter 10
    Lab: Acock, Chapter 11

Week 15, May 2 & May 4: Autocorrelation
    Doughtery, Chapter 12
    Lab: Review for Final Exam

Recommended:
"The Hardest Science: Everything is F*****: The Syllabus"
    https://hardsci.wordpress.com/2016/08/11/everything-is-fucked-the-syllabus/

Final exam TBA

The College of Liberal Arts and Sciences
Policies and Procedures

Administrative Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS handbook (http://www.clas.uiowa.edu/students/handbook/)

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. (*Operations Manual* can be found here: http://www.uiowa.edu/~our/opmanual/iii/15.htm#)

Accommodations for Disabilities

A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Academic Honesty

The College of Liberal Arts and Sciences expects all students to do their own work, as stated in the Academic Honor Code (http://clas.uiowa.edu/students/handbook/academic-fraud-honor-code). Instructors fail any assignment that shows evidence of plagiarism or other forms of cheating, also reporting the student's name to the College. A student reported to the College for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

CLAS Final Examination Policies

Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the Associate Dean for Undergraduate Programs and Curriculum.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook (http://www.clas.uiowa.edu/students/handbook/x/#5) DEO: Sara Mitchell, 343 SH, 335-2358

Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy (http://www.uiowa.edu/~eod/policies/sexual-harassment-guide/index.html).

Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety web site (http://police.uiowa.edu/stay-informed/emergency-communication/).

Student Resources: The Writing Center www.uiowa.edu/~writingc/ and the Campus Information Center's Tutor Referral Services http://imu.uiowa.edu/cic/ at the IMU.

*These CLAS policy and procedural statements have been summarized from the web pages of the College of Liberal Arts and Sciences (http://www.clas.uiowa.edu/) and The University of Iowa *Operations Manual* (http://www.uiowa.edu/~our/opmanual/index.html).