1 Course Description

This course provides an introduction to ordinary least squares (OLS) regression analysis and the uses of OLS in political science. It represents an important first step towards being able to interpret, critique, and conduct regression analyses of political data. Much of the course will focus on the assumptions underlying OLS regression, the implications of violations of these assumptions, and solutions to these violations.

2 Course Student Learning Objectives (SLOs)

1. An understanding of the assumptions, limitations, extensions, and applications of regression analysis in political science (Advances PLOs 3 & 5).

2. An ability to use the tools of regression analysis to test hypotheses and appropriately model political phenomena (Advances PLOs 3 & 5).

3 Political Science Learning Objectives (PLOs)

1. An understanding of the processes, theories, and empirical regularities of political institutions and political behavior in the student’s chosen emphasis area: American politics, comparative politics, or international relations.

2. An ability to employ critical thinking and demonstrate social scientific literacy, including basic quantitative literacy.

3. A capacity to utilize contemporary social science research methods to conduct rigorous research on political phenomena.
4. Effective written communication skills, especially the ability to convey complex concepts and information in a clear and concise manner.

5. An ability to apply abstract theory and research methods to understand contemporary political events and public policies.

4 Prerequisites

The prerequisite for this course is POLI 210. I assume that you already understand the basics of probability, probability distributions, and hypothesis testing, and have already had a basic introduction to OLS regression and Stata.

5 Required Reading


Although we will not read every page of these books, they will be serve as importance resources for you in the future. Please read the assigned sections before you come to class and then review it again after class. As you read these books, remember that reading statistics books is not like reading novels. You may have to read some sections several times before they make sense. Hang in there.

6 Recommended Reading

7 Evaluation

Your final grade will consist of the following components:

- Midterm Exam (20%)
- Final Exam (20%)
- Homework (20%)
- Research Paper & Presentations (40%)

7.1 Homework

There will be homework assignments that require you to apply the concepts and tools learned in class to real political science data. In order to complete these homework assignments, you will need access to Stata, R, and \LaTeX. Stata and R are statistical analysis software programs. The majority of your assignments will be completed in Stata; I assume that you have a working familiarity with this software based on your previous coursework. Some of your assignments will also be completed in R; I assume that you have no previous knowledge of R. My own knowledge of R is limited, and we are going to learn it together. You will be turning in your homework written in \LaTeX; this syllabus is written in \LaTeX. It is a typesetting program that will come in handy as you write research papers that include mathematical notation. We will discuss these programs (as well as how to access them) in more detail at the start of the course. Over the course of the semester, I am more than happy to help you learn these programs, but you should also take responsibility for learning them yourself. Go to the lab, and experiment with the programs. Each of them has a very good online community as well as various help options. You should learn how to navigate them.

7.2 Research Paper

You will write an original research paper in which you identify an interesting research question, provide a theoretical answer to the question you pose, test your theoretical expectations by utilizing OLS regression to analyze relevant data (while demonstrating sensitivity to the assumptions of OLS), and interpret the results. Your paper should be the length of a short article (i.e., 15 to 20 pages) and should approach the quality of a paper that could be presented at a political science conference. Part of the grade for your paper will include your work on smaller paper assignments due on the dates listed below.

You will present your papers at the end of the semester two times. First, you will present the paper one-on-one to me. I will offer you feedback (which you will hopefully implement), and you will then present the paper in front of your colleagues and faculty in the department.
We will emulate a conference setting in the second presentation, which means that each of you will get approximately 10 to 15 minutes to present your paper.

8 Course Schedule

January 21, 2014: Review of Basic Bivariate Regression

- Required Reading: Gujarati: Introduction, Chapters 1-2.

January 28, 2014: Multiple Regression

- Required Reading: Gujarati: Chapters 3-5
- Paper Assignment Due: Research Question

February 4, 2014: Prof. Conrad to Germany – No Class

February 11, 2014: Multiple Regression & Matrix Estimation of OLS

- Required Reading: Gujarati: Chapters 7-8, Appendix B-C
- Paper Assignment Due: Theory and Hypotheses

February 18, 2014: Multicollinearity & Heteroscedasticity

- Required Reading: Gujarati: Chapters 10-11.

February 25, 2014: Autocorrelation

- Required Reading: Gujarati: Chapter 12.

• **Paper Assignment Due**: Observational Measures of Concepts & Data Availability

March 4, 2014: **Specification #1 (Linearity & Dummy Variables)**

• **Required Reading**: Gujarati: Chapter 9.


March 11, 2014: **Midterm Exam**

March 18, 2014: **Specification #2 (Interaction Terms)**

• **Required Reading**: Gujarati: Chapter 15.


• **Paper Assignment Due**: Statistical Model and Associated Tests

March 25, 2014: **Spring Break – No Class**

April 1, 2014: **Specification #3 (Omitted Variables, Outliers, & Selection)**

• **Required Reading**: Gujarati: Chapters 13-14.


• Paper Assignment Due: Draft Empirical Analysis Section

April 8, 2014: Time Series Models

• Required Reading: Gujarati: Chapters 17 and 21.


April 15, 2014: Panel Data Models

• Required Reading: Gujarati: Section 15.12.


• Paper Assignment Due: Full Paper Draft for Peer Circulation

April 22, 2014: Instrumental Variables & Causal Inference

• Required Reading: Gujarati: Chapters 18-20.


April 29, 2014: **LIMITED DEPENDENT VARIABLES & INTRO TO MLE**

- **Required Reading**: Gujarati: Chapter 16.


- **Paper Assignment Due**: Final Paper

May 6, 2014: **FINAL EXAM**

Final Research Paper Presentations: TBA