Quantitative Political Methodology

Instructor: Patrick Cunha Silva

Class Meetings:
Tuesdays and Thursdays
10-11:30 AM
Seigle L003

Office Hours:
Wednesdays, 10-12pm
Seigle 255
pcunhasilva@wustl.edu

Course Description

What makes individuals more likely to vote? What makes certain policy interventions like universal healthcare more important than others in terms of improving social welfare? Does foreign aid promote better standards of living for individuals in receiving countries? Providing answers to these questions is at the core of modern social science research and it requires, in most instances, solid statistical and data analysis. In this course, we will study fundamental concepts of statistical inference, understand the linear regression model (the main tool in Social Sciences), and the challenges to causal inference. We will also learn programming skills for data analysis. Specifically, students will learn how to do descriptive analysis, test hypotheses, and build graphical representations of data using `R`. At the end of this course, students will be able to analyze data independently, interpret statistical results, and present their findings graphically.

Course Structure

We will use both lectures and labs in this class. Lectures will cover the main concepts in the readings in detail. During labs, students will have the opportunity to practice their new skills in hands-on exercises. We will use data from research published in top academic journals to conduct data analysis. Labs will also provide students the opportunity to develop their programming skills, which is a highly valuable asset in both academia and industry.

Course Requirements

Participation: Students are encouraged to participate actively. Participation will be judged based on your engagement in discussions and questions asked/answered during lectures and labs. Participation will be worth 10% of the total grade.

Problem Sets: We will have four problem sets during the semester. These problem sets will give students the opportunity to conduct data analysis and apply statistical concepts. In addition to the answers, students will have to submit their `R` code. Collaboration among students is encouraged, but students should typeset and submit their own work. Each problem set will be worth 10% of the final grade.

Mid-Term Exam: We will have one closed-note, closed-readings exam after we finish week six. The exam will contain T/F, multiple-choice, and short essay questions. Questions will ask for interpretation and description of concepts covered in readings, class, and labs. The mid-term exam

will be worth 15% of the final grade.

Research Poster: Students will work in groups to create a research poster. The poster must contain (1) theory, (2) hypothesis, (3) research design, (4) data, and (5) results. During the semester, students will submit two short assignments in which they will describe their research idea and explain their research design and data. These assignments will help students to craft their final projects. Students will present their posters to faculty and graduate students of the Department of Political Science on the last day of classes. Examples of posters will be provided to students and students will be randomly assigned into groups in the second week of class. Each short assignment will be worth 5% of the final grade and the final poster will be worth 25% of the final grade.

Course Policies

Attendance: I will not take attendance for this class. However, I must emphasize that your attendance will affect your final grade, given that 10% of your grade is composed of participation.

Late Assignment: Late assignments will not be accepted. If you have any conflict related to your due dates, please let me know at the beginning of the semester.

Use of Technology: The use of cell phones and tablets is not allowed. Students can use their laptops only to take notes or when asked by the instructor. Any use of technology that does not follow this policy will count against your participation grade.

Students with disability: Students with disabilities needing academic accommodation must submit a letter from the office of Disability Resources indicating the need for accommodation and its type. Students must submit this letter during the first three weeks of class.

Religious observances: Students who anticipate that a religious observance will conflicts with their participation should contact the instructor in the first two weeks of class to arrange an accommodation.

Grading

Letter grades will be assigned using the following scale (in %):

A : ≥ 94	B+:≥ 87	C+: ≥ 77	D+: ≥ 67	F: ≤ 60
A−: ≥ 90	B: ≥ 83	C: ≥ 73	D: ≥ 63	
	B-: ≥ 80	C-: ≥ 70	D-: ≥ 60	

Software

We will use the statistical package `R` in this class (`https://cran.r-project.org/`). `R` is an open-source software compatible with all major operating systems. Knowledge on `R` is not a prerequisite to this class. Students will be introduced to `R` along the semester during labs, readings, and problem sets.

Course Readings

We will use two books as our main readings. All other readings will be available on Canvas. Students are expected to do the readings before the lecture. There are overlaps between readings in the same weeks. These overlaps are intentional and aim to provide students different approaches to the same content. My experience learning these topics is that there is no book that works for all people and for all subjects. The assignment of multiple readings on similar subjects can improve the chances that one of the readings works best for you.

Text Books:

- Kellstedt, Paul and Guy Whitten. 2018. The Fundamentals of Political Science Research (3rd Edition). Cambridge University Press.
- Imai, Kosuke. 2018. Quantitative Social Science: An Introduction. Princeton University Press

Course Schedule

Week 1: Overview and Introduction to `R` *and* `R-Studio`

- Kellstedt and Whitten, Chapter 1
- Imai, Section 1.3
- de Vries, Andrie and Joris Meys. 2015. *R for Dummies*, Chapters 1 and 2, Appendix

Week 2: Experiments and Causality

- Kellstedt and Whitten, Chapter 3
- Angrist, Joshua and Jörn-Steffen Pischke. 2008. *Mostly Harmless Econometrics*, Chapter 1
- Imai, Sections 2.1-2.4

Week 3: Observational Studies

- Kellstedt and Whitten, Section 4.3
- Imai, Sections 2.5-2.7

Week 4: Measurement

- Kellstedt and Whitten, Chapter 5
- Imai, Sections 3.1-3.4

Week 5: Data Structure and Variables

- Kellstedt and Whitten, Chapter 6
- de Vries, Andrie and Joris Meys. 2015. *R for Dummies*, Chapters 14

Week 6: Probability and Statistical Inference

- Kellstedt and Whitten, Chapter 7
- Imai, Section 6.1

Week 7: Mid-Term

- Mid-Term Exam

Week 8: Uncertainty and Hypothesis Tests

- Kellstedt and Whitten, Chapter 8
- Imai, Sections 7.1 and 7.2

Week 9: Bivariate Relationships

- Kellstedt and Whitten, Chapter 9
- Imai, Section 4.2

Week 10: Multiple Regression

- Kellstedt and Whitten, Sections 10.1-10.8
- Angrist, Joshua and Jörn-Steffen Pischke. 2008. *Mostly Harmless Econometrics*, Section 3.1

Week 11: Regression and Uncertainty

- Imai, Sections 7.3

Week 12: Limited Dependent Variables and Time-Series Data

- Kellstedt and Whitten, Sections 12.1-12.3

Week 13: Regression and Causal Inference 1

- King, Gary, Robert O. Keohane, and Sidney Verba. 2021. *Designing Social Inquiry*, Sections 3.1-3.3
- Angrist, Joshua and Jörn-Steffen Pischke. 2008. *Mostly Harmless Econometrics*, Section 3.2

Week 14: Regression and Causal Inference 2

- Angrist, Joshua and Jörn-Steffen Pischke. 2008. *Mostly Harmless Econometrics*, Sections 4.1 and 6.1

Week 15: Poster Session

- Poster Session