POL 211

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Course Description

This course is the first of a three-course sequence on empirical research methods that provides you with a solid foundation for engaging with and producing high quality empirical research in political science.

This course is an introduction to quantitative methodology in political science. Along the way, this course will help you develop technical knowledge of the basics of statistical inference. **This is a lecture-based methods course, not a discussion-based seminar.**

Like all of the methods classes in the Political Science Department, this course will move quickly and will cover a lot of foundational topics. You should be prepared to do a lot of reading, complete many practice problems, use the R statistical computing language.

It will take multiple attempts to understand this material. POL 211 is your first go-through; you should keep going back to the readings and notes from this class as you proceed in your graduate training. The tools you learn here will be useful for your entire career.

Required Textbooks

Gailmard, Sean. 2014. *Statistical Modeling and Inference for Social Science.* New York: Cambridge University Press.

Bueno de Mesquita, Ethan, and Anthony Fowler. 2021. *Thinking Clearly With Data: A Guide to Quantitative Reasoning and Analysis.* Princeton, NJ: Princeton University Press.

Course Outline

Note: the exact sequence of topics and time devoted to each topic may be subject to change during the quarter.

Topic 1: Introduction (~1 lecture)

Introductions, methodology at UC Davis, theory and empirics, credibility & thinking clearly with data.

Topic 2 (review): Measurement and relationships and data (~2 lectures)

Structure of a dataset, types of variables, where data comes from, measurement issues, describing individual variables: central tendency, dispersion, visualizations.

Describing relations between variables: bivariate distributions, scatterplots, crosstabs, correlation, linear regression.

Topic 3A: Learning from Data I: Modeling DGPs (~5 lectures)

Data generating processes: probability theory, defining and summarizing probability distributions.

Topic 3B: Learning from Data I: Statistical Inference (~3 lectures)

Statistical inference: sampling, hypothesis testing, estimation.

Topic 4: Learning from Data II (~3 lectures)

Causal inference: the potential outcomes framework, the designed-based approach, heterogeneous effects.

Topic 5: Issues in Research Design (~3 lectures)

Note: We will cover this topic depending on progress made with the previous topics – this will be skipped if the previous material requires more time.

Publication bias and learning from the literature, open science and research ethics, partial equilibrium thinking, data collection.

Learning Objectives

By the end of the quarter, students should:

- Understand the fundamentals of data, including its origins and associated challenges.
- Have acquired skills in descriptive and inferential statistics, focusing on data generating processes and probability.
- Have gained insights into causal inference and the importance of avoiding common pitfalls in data analysis.
- Have developed critical thinking skills for evaluating research findings and academic literature.

Mathematical Prerequisites

Students should be familiar with the material covered in the Department's Math Camp. For additional review or practice, these books can be consulted:

- Moore, Will H. and David A. Siegel. 2013. *A Mathematics Course for Political and Social Research.* Princeton, NJ: Princeton University Press.
- Houston, Kevin. 2009. *How to Think Like a Mathematician: A Companion to Undergraduate Mathematics.* New York: Cambridge University Press.

Additionally, you can find resources in the Bridge Materials compiled by Lily Huang.

Finally, additional math texts can be found in the Methods Bibliography

Course Assessments

Your final grade in the course will be based on the following components:

- **Attendance and engagement (10%):** You will be expected to attend and be engaged in lectures. If you need to miss class, you should email me in advance.
- **Lab Notebook (10%):**
  - You should prepare and turn in a lab notebook by the deadline posted in Canvas (at the end of the quarter). Your lab notebook should include the following items:
    * notes you took in class
    * notes you prepared from readings
    * any study guides or outlines
    * any other materials you prepared to study/learn the material
    * your work on any additional problems you completed
  - Your lab notebook must be neatly organized and easy for me to follow. You can turn in a hard or PDF copy, but either way, it should still be neatly organized (e.g. using bookmarks, section dividers, etc.). You will get no credit if you turn in a scraggly pile of papers or a collection of disorganized PDFs.
- **Problem Sets (50%)**
  - You should complete the (roughly) weekly problem sets I assign and turn them in according to the instructions I provide. They will be graded for completeness and effort. You will get no credit for any problem set you turn in late.
- **Final Exam (30%)**
  - There will be a three-hour comprehensive, in-person final exam during exam week. Details to be announced later in the quarter.

Additional requirements for students in the methods subfield

As per department policy, students who choose methods as a subfield are required to complete additional problems on the assignments, which includes problem sets and the final exam. These additional problems will be more difficult than the problems that all students have to complete. I recommend that all students complete the additional problems, since this will keep the option open to choose methods as a subfield. Conversely, not completing the additional problems will bar you from choosing methods as a subfield. For additional information on the methods subfield, you

can also contact the chair of the methods committee (for 2023-2024: Prof. Ryan Hubert, rhubert@ucdavis.edu).

Methodology Coursework at UC Davis

The Department's faculty views methods training as an integral part of its graduate program and accordingly requires several methods courses of all Ph.D. students. Students who choose to indicate methods as a subfield should have an exceptionally high degree of fluency with the material in these required courses (POL 211–213 and POL 215) and the topics covered in the Department's math camp, as well as general facility with a wide range of contemporary methodological approaches and debates in political science. Typically, a student who specializes in methods will have taken several advanced courses in methodology (beyond the required sequence). To achieve a passing score on the methods field exam, a student must demonstrate that they have reached a level of methods fluency that is consistent with their choice to specialize, at least partially, in methods.

Studying political methodology is a labor-intensive activity. In this course, students will be expected to devote significant time to learning the material. To accomplish this, students should complete the readings and assignments in a timely manner and actively participate in class sessions.

Learning Resources

- **Lectures**: Lectures and accompanying slides are the primary structure for course material, with regular attendance expected for success.
- **Textbooks**: I have specified required textbooks in the syllabus, and supplemental readings may occasionally be posted in the Canvas course site.
- **Problem Sets**: I will issue problem sets approximately weekly; they are crucial for understanding quantitative methods. Problem sets must be completed and submitted electronically via Canvas by the announced deadlines.
- **Study Groups**: I recommend forming study groups for collaborative problem-solving. Study groups are a vital resource for mastering the course material.
- **Teaching Assistant**: This course has a teaching assistant, whose contact information is at the top of this syllabus.
- **Office Hours**: Both the teaching assistant and the instructor offer weekly office hours; additional one-on-one meetings with the instructor can be scheduled, but attending office hours for course-related questions is preferred.

Course grades

Most PhD-level courses tend to be graded on a compressed grade scale, ranging from A+ to B-. Therefore, it should be a rare event that students will get an A- or a lower grade in a graduate class in the political science department.

However, if you take courses in more "technical" subjects (like statistics or economics) it may be more common to receive grades below an A. Members of our department's faculty understand this, and encourage students to pursue these courses despite the risk of lower grades. Feel free to

come speak to me or the 2023/24 methods coordinator Ryan Hubert if you are interested in these kinds of courses.

Students with Disabilities

It is both my strong preference as well as my responsibility that this course is accessible to all students. If you believe you have a disability requiring an accommodation, or would like additional information about the resources available for students with disabilities, please visit the UC Davis Student Disability Center website at https://sdc.ucdavis.edu/. I encourage you to do this as soon as possible, to ensure that needs for accommodation are met in the best possible way.

Academic Conduct

I expect that all students have read and understood the University's Code of Academic Conduct. While I do not expect any students in this course will violate the Code, please be aware that cheating, plagiarism, or other violations will not be tolerated and will be reported to Student Judicial Affairs for appropriate disciplinary action. For more information about academic integrity and the Code of Academic Conduct, please visit the Office of Student Support and Judicial Affairs website at https://ossja.ucdavis.edu/

Inclusive and Safe Community

As an instructor, one of my responsibilities is to help create an inclusive and safe learning environment for my students and for the campus as a whole. If there is something specific about your situation that you think I should know, such as preferred names/pronouns or special circumstances that will affect your participation in class, please feel free to email me or come to my office hours.

Please be aware that I have a legal responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information about sexual harassment, sexual violence or discrimination to a confidential employee who does not have this reporting responsibility, you can find a list of those individuals at http://hdapp.ucdavis.edu/ and http://sexualviolence.ucdavis.edu/.

Acknowledgements

The course content, structure and materials, including this syllabus, are based on the Fall 2022 iteration of this course, taught by Prof. Ryan Hubert, who I thank for sharing his materials. Additionally, some parts of this course are based on A User's Guide to Statistical Inference and Regression and other materials by Matthew Blackwell. This syllabus is based on a template by Robert Kubinec.