# POLI 171: Making Policy with Data

Summer 2021

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## Course Description

This course explores how we can make policy recommendations using data. The overall goal of the course is to provide a survey of the most commonly-used empirical tools for political science and public policy research. Our focus is design-based causal inference, or the use of statistical methods to answer research questions that concern the impact of some cause (e.g., an intervention, a change in institutions, passage of a law, changes in economic conditions, or policies) on a certain outcome (e.g., vote choice, income, election results, levels of violence, political attitudes). We cover a variety of causal inference designs and methods, including experiments, regression, and matching. We will analyze the strengths and weaknesses of these methods using applications from the real world.

The objectives of this course include:

1. Introducing an analytical framework of policy evaluation
2. Surveying the most commonly-used research designs for policy making
3. Introducing the most basic (and some of the most important) statistical concepts
4. Providing basic data analytical skills crucial for today's job market and academic research, including basic R programming

# Evaluation

- Three Problem Sets (20% each; 60% total). Posted on Canvas one week before the due date. All homework must be sent as an electronic copy to the teaching assistant.
  - HW1 will consist of basic R programming exercises, and HW2 will cover the potential outcomes framework and simple randomized experiments. You should work independently on both assignments; **do not collaborate with any other students on these assignments.**
  - HW3 will consist of slightly more complicated data analysis problems in R. **You may collaborate with a single other student on these assignments**, or if you prefer, you may work independently. If you collaborate, you and your coauthor will turn in a single document, and you will each receive the same grade for the assignment.
  - Late submission will be penalized (a day = 3 points; in other words, if your submission is late for 7 days, you will receive 0 points for that one).
- Final exam (25%). September 03, 8-10 AM. Closed book. The final exam will be sent out to you via email. You should complete the exam on your own and send your completed exam back to the teaching assistant before the exam ends at 10 AM.
- Come to office hours (15%). Each student is expected to come to office hours at least twice throughout the course. You can choose to meet with either the instructor or the teaching assistant. This is an intensive summer methods class, and remote learning makes it harder. Coming to office hours is one way to help keep you on pace with the class. You can sign up for the instructor's office hours via this link here, or sign up the teaching assistant's office hours via this link here

# Expectations and Policies

- To accommodate students in different time zones under the pandemic situation, all lectures and lab sessions will be pre-recorded and published on the course Canvas site. We expect you to carefully watch all lecture recordings and practice the lab exercises on your own. The instructor will be online during regular class hours to answer any questions you may have about the course.
- If you seek a re-grade, you must email the TA within 24 hours of the assignment being returned to the class, and explain – in that email and in detail – why you believe you deserve reconsideration. The TA then has the ability to review the entire assignment, and he has the authority to increase your grade, decrease your grade, or keep the grade unchanged.
- There is no prerequisite for this course. However, ECON5/POLI5D and POLI 30 (or the equivalent) is strongly recommended.
- This course covers graduate-level concepts with undergraduate-level math. The focus is on the intuition, and the math will not be particularly difficult. If you passed POLI 30, you should have no problem doing well in this course.

- Prior experience with R programming will be useful, but not required. If you haven't used R before, you should expect a steep learning curve. Although we will cover the basics during our four lab sessions, most of you will master R programming only through doing it yourselves and by learning from each other.
- If you choose to collaborate with another student on HW3, we expect that you and your coauthor will collaborate on every portion of the assignment. You should understand (and be prepared to explain) every part of the document that you turn in.
- All lecture slides and assignments will be available on this course's Canvas page.

# Books

### Required Textbooks

1. Gertler, Paul J., Sebastian Martinez, Patrick Premand, Laura B. Rawlings, Christel M. J. Vermeersch. *Impact Evaluation in Practice.* The World Bank. Available on the course Canvas site.
2. Imai, Kosuke. *Quantitative Social Science: An Introduction*, by Kosuke Imai, Princeton University Press. Available on the course Canvas site.

# Computation

The labs and homework assignments of this course will use R, an open-source computing language that is very widely used in statistics and the social sciences.

- R runs on a wide variety of UNIX platforms, Windows and MacOS. R makes programming very easy, has strong graphical capabilities, and also contains canned functions for most commonly-used estimators.
- You can download R for free here. Select the link that matches your machine's platform. If you are using Windows, click on the "install R for the first time" link, and then click on the link for the latest version of R. If you are using MacOS, scroll down and find the version of R that matches your version of MacOS.
- RStudio is an integrated development environment designed for R. It is possible to program in R without using RStudio, but RStudio makes R programming much easier, especially for beginners. You can download RStudio for free here. Choose the RStudio Desktop Open Source License option, and select the installer designed for your platform.
- We will cover the basic tools that you need for the homework assignments in lab sessions.

# Course Schedule

## Introduction

*Reading: Gertler, Chapter 1, pp. 3-9*

- Lecture 1 Aug. 02: Introduction, Course Overview & **R Lab 1**: R Basics

## Module I: Causality and Potential Outcomes

*Reading: Gertler, Chapter 3*

- Lecture 2 Aug. 04: The Potential Outcomes Framework & **R Lab 2**: Subsetting and RMarkdown
- Lecture 3 Aug. 09: Omitted Variable Bias and Selection Into Treatment

## Module II: Randomized Control Trials (RCT)

*Reading: Gertler, Chapter 4, pp. 49-69*

- Lecture 4 Aug. 11: Randomization and Experiments & **R Lab 3**: RCT 1
- Lecture 5 Aug. 16: Inference and Experiments & **R Lab 4**: RCT 2
- Lecture 6 Aug. 18: Multiple Treatment Arms and Heterogeneous Treatment Effects

## Module III: Basic Observational Studies

*Reading: Gertler, Chapter 7*

- Lecture 7 Aug. 23: Selection on Observables & Regression and Matching
- Lecture 8 Aug. 25: **R Lab 5**: Regression and Matching

## Review and Final Exam

- Lecture 9 Aug. 30: Summary and Conclusion
- Lecture 10 Sept. 01: Review Session
- Final Exam: September 03, 8-10 AM. Closed Book. Online.