

**Statistics for Program Evaluation  
PP249, Fall 2022**

Course lecture: Monday/Wednesday 10:10am-11:30am, GTU 102  
Notes: GTU is located on 2465 LeConte Ave, Berkeley 94709. It's a 5-8mn walk from GSPP main building. There is a code to enter the building that will be sent by email by Nandita Garreffa.

Course section: Friday 10:10am-11am, GTU 102

Instructor: Claire Montialoux (she/her), [claire.montialoux@berkeley.edu](mailto:claire.montialoux@berkeley.edu)  
Office hours Mondays 2pm-4pm; Sign up [here](#).  
Location: 2607 Hearst Avenue, #209  
Berkeley, CA 94720

GSI: Ross Chu (he/him), [berkeley.pp249@gmail.com](mailto:berkeley.pp249@gmail.com)  
Office hours:

- Sep 2 (Friday)
  - 9 am - 10 am (by appointment only)
  - 11 am - 12 pm (open hours)
- Sep 6, 13, 20 (Tuesday)
  - 4 - 5 pm (by appointment only)
  - 5 - 6 pm (open hours)
- Sep 30, Oct 7, 14, 21, 28, Nov 4, 18, Dec 2 (Fridays)
  - 9 am - 10 am (by appointment only)
  - 11 am - 12 pm (open hours)
- Nov 10 (Thurs)
  - 2 - 3 pm (by appointment only)
  - 3 - 4 pm (open hours)

Location: zoom meeting room [here](#). Open hours are first-come first-served.  
For appointments, sign up [here](#).  
Please see bCourses for most up-to-date schedule.

**Description:** How do we know whether a program or policy is having its intended impact? This course will cover the methods used to answer this question. The focus will be on quantitative studies, with an emphasis on the techniques used in experimental and non-experimental evaluations. We will also discuss the role of program evaluations in policy analysis and design, as well as the limits to program evaluation as a tool for policy improvement. Examples will be drawn from policy interventions in domestic and international settings. For applications, this year's theme will be racial and ethnic disparities.

**Prerequisite:** This course is designed for applied practitioners, particularly advanced MPP students, and is not intended to prepare students for academic research. Prerequisite: PP240B with a grade of B+ or better; proficiency in a statistical programming language (i.e., Stata or R)

**Objectives:** This course has two primary objectives:

- Learn to be an informed, critical consumer of empirical program and policy evaluations. By the end of the course, you should be able to read and understand technical empirical studies and to judge the degree to which they can provide an evidentiary basis for policy.
- Learn the fundamentals of designing program evaluations and analyzing the data that they generate. You will understand the primary statistical tools that are used in program evaluation and be able to assess whether a program can support the application of those tools.

**Course timing and logistics:** Classes will be held in-person class from 10:10am to 11:30am every Monday and Wednesday and in-person section from 10:10am to 11:00am every Friday. There is not currently a plan for a hybrid option, though this could change. Please let the teaching staff know as soon as possible if you are not able to regularly attend class or sections (e.g., due to a scheduling conflict), so we can discuss options.

**Other scheduling notes:** There will be no class on September 5 (Labor Day), on October 17 and on November 23 (Thanksgiving).

**Support for equity and respect for diversity:** I look forward to spending the semester exploring program evaluation with you. Over the semester, you will experience a range of feelings, including: success and failure; challenge and boredom; accomplishment and frustration. Please know that I, and your fellow students, will be here to help you through it. Also, persistence and hard work means a lot more in this class than “intelligence.” Put in time and effort and I know you will succeed. As an instructor, I will do everything in my power to give you all the resources and support to help you succeed. If I am not doing this, please do feel free to reach out to me. Again, I am here to see you succeed as you learn statistics for program evaluation. Please hold me accountable as I will hold you accountable. (adapted from [here](#)).

“It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students’ learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.” (see [here](#)).

**Alternative courses:** UC Berkeley offers a wide range of courses on “impact evaluation” and related topics. The two courses closest to PP249 are “Applied Econometrics” (ARE 213) and “Applied Impact Evaluation” (PH 290). Historically, Jesse Rothstein and Avi Feller have tried hard to make PP249 the “middle ground” between these two courses. I’ll attempt to do the same this year. In general, ARE 213 covers more advanced and more technical content, with a focus on preparing students for academic research. PH 290 instead focuses more on practical challenges in impact evaluation and also has a greater emphasis on evaluations outside the United States. Both are excellent courses that MPP students have found valuable in the past.

I sincerely hope that you stick with PP249, which is intended as a follow-up course to PP240B. Your time is valuable, however, and I want to help you find the course that's the best match for your goals and interests. So please reach out if you'd like to discuss one of these alternatives.

**Assignments and grading:**

Your grade will be based on three components:

- (1) *Class participation (15%)*. The value-added of taking this class (rather than a MOOC) is that we can learn together. We hope and expect that you will participate to the best of your ability, such as by asking questions, participating in group and individual coding exercises, and interacting with teaching staff.

*Quizzes*. Depending on course format and timing, a portion of the class participation grade will be determined by regular check-in quizzes. This type of repeated, low-stakes assessment has worked well in the past as checks for understanding.

- (2) *Problem sets and paper summaries (50%)*. We will spend most of our instructional time working through problems and discussing applications. The best way to learn this, however, is to try this yourself. The current plan is to have three main types of independent work:

- a. *Problem sets*. A total of 4 problem sets will be due. They will vary in form – some will be pencil-and-paper exercises, and some analyses of real data sets. The hope is that these completed problem sets will be useful references for you after you leave GSPP. You are asked to discuss the assignments in groups of 3-4 people, and write them in groups as well (i.e. one problem set written per group). Late assignments will not be accepted (see below for a discussion of late work). Problem sets will be assigned two weeks in advance. They will be due on the following dates:

- i. Problem set 1 (statistical inference), due by 09/09 before 11:59pm.
- ii. Problem set 2 (observational studies), due by 09/30 before 11:59pm.
- iii. Problem set 3 (randomized control trials), due by 10/14 before 11:59pm.
- iv. Problem set 4 (quasi-experiments), due by 12/02 before 11:59pm.

- b. *Policy briefs*. For the second unit of the class (i.e. on randomized control trials), you will be asked to write a policy brief that summarizes a paper/report of a list posted on bCourses or of your choice – and approved by the teaching staff. The policy brief should be 2-3 pages long, times new roman 12pt single space (including tables and graphs). It is intended to be a policy-oriented summary of an academic study.

- v. Policy brief 1 (randomized control trials), due by Friday 10/28 before 11:59pm.

- c. *“Explainer video”*. For the last unit of the class (i.e. on quasi-experiments), you will be asked to choose a paper/report and to explain it in a 5 minute video with 3-4 slides).

- vi. Explainer video (quasi-experiments), due by Friday 11/18 before 11:59pm.

- (3) *Final project (35%)*. See description below.

- Final project proposal (1 page) due by 11/11, before 11:59pm.
- Final project materials due by 12/9, before 11:59pm.

**Grading:** Congratulations on reaching the point in your career where your grades have very little impact on your future life! During the first class period, we will discuss different options to minimize the role of grades in our learning during the semester.

### Additional course policies

#### Late policy:

- **Drop lowest assignment score.** We will not, in general, accept late problem set submissions for this course. Instead we will simply drop the lowest score — no questions asked. This has worked well in the past and has helped reduce student stress around late work piling up.

**Honor Code and Academic Honesty Policy:** We at UC Berkeley have adopted this Honor Code: “As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others.” Your instructors join you in pledging to adhere to this code.

We take academic honesty very seriously. There is basically one way to fail this class: plagiarizing. Sometimes the rules around plagiarism can feel unclear. We urge you to spend time familiarizing yourself with the rules of academic conduct and *ask* if you have any questions (<https://sa.berkeley.edu/conduct/integrity/definition>). If you ever find yourself in a position of needing to plagiarize or otherwise do less-than-honest work or seek additional help or support, we hope that you choose the latter — that’s why we’re here!

**Special Accommodations.** If you require disability-related accommodations for exams or lecture, if you have emergency medical information that you wish to share, or if you need special arrangements in case the building must be evacuated, please let me know as soon as possible. Per university regulations, requests for exam or other presentation accommodations must be received (along with any required documentation from the Disabled Students Program) and acknowledged at least two weeks in advance of the exam.

**Wellness and support.** Being in graduate school can be difficult, and can be differentially difficult for some students. We will be a stronger community if we all try to reach out when we see someone struggling, and/or support each other as we go through challenges. In practice, that means a few things:

- If material discussed in class is triggering or may be triggering, feel free to leave at any time and/or talk to me about making other arrangements.
- If at any point you’re struggling for any reason, I urge you to reach out to the teaching team or available services including Be Well Cal (<https://uhs.berkeley.edu/bewell>) and Counseling services (<https://uhs.berkeley.edu/counseling>). Please note that I am not allowed to keep reports of sexual harassment or sexual violence confidential, but if you need confidential resources, they are available to you through the CARE Advocate Office (<http://sa.berkeley.edu/dean/confidential-care-advocate>).

**Academic Accommodations Hub.** This webpage (<https://evcp.berkeley.edu/programs-resources/academic-accommodations-hub>) gathers all the information regarding support measures and academic accommodations to ensure all students have a fair chance for academic success.

**Technology Use in Class: Opt-In Laptop Policy.** There is a growing body of (pre-pandemic) evidence that, on average, laptop use in class has an adverse effect on educational outcomes. But, as we know, what holds on average might not be true for any one individual, nor do we have a good sense for whether this evidence will continue to apply in this new world. Rather than micro-manage this decision for you, we will adopt an **opt in laptop policy** for this course. If you feel that you learn better with a laptop, email the GSI by the start of the third class on **August 31** to be put on the “laptop list.” With exceptions for group coding and data exercises (which we will try hard to announce ahead of time), we will try hard to (gently) remind you of your choice later in the semester.

### **Additional details on course substance**

#### Final paper

There are two main options for your final paper.

- I. *Summarize the evidence.* Pick a policy topic and critically evaluate the empirical evidence for and against a particular program or set of programs (covering at least three relevant studies). Your report should:

- Discuss and carefully define the causal questions relevant to assessment of the program(s);
- Discuss and carefully define the questions that the studies attempt to answer;
- Describe and discuss the appropriateness of the study designs;
- Describe the results; and
- Assess the state of knowledge about your policy topic based on your chosen studies, and identify knowledge gaps.

It is crucial for this paper that you choose a topic on which program evaluation evidence of the nature covered in this course is available. This may mean choosing a question that is somewhat distantly related to the topic you are really interested in.

This is essentially a compilation of the kind of work you’ll be doing throughout the semester summarizing papers (albeit in written form rather than via video).

- II. *Design a quasi-randomized or randomized study.* Pick a policy topic and design a rigorous empirical evaluation. Your proposal should:

- Discuss and carefully define the causal questions relevant to assessment of the program(s) and the questions your study attempts to answer;
- Detail an empirical approach to investigating this question. You should discuss population of interest, data collection, and your proposed estimation strategy;

- Describe and discuss the appropriateness of your methodology, including how it compares to alternative approaches; and
- Identify any shortcomings with your approach, and how you would address these limitations.

There are no length requirements, though I expect that most papers will be in the 4-7 page range (times new roman 12pt single space, including tables and graphs). **Papers should include an executive summary of not more than one page.**

Papers are due on **December 9 before 11.59pm**; I will consider alternative due dates, but these must be finalized by November 11. You should begin this paper well before the due date, and are encouraged to talk with Ross and me (during office hours or by appointment outside those times) about your choice of topics. To enforce good planning, you are required to submit a brief description of your topic by **November 11 before 11.59pm**. For papers of type I, this should include a list of the studies you will include. For papers of type II, it should include an outline of the proposed research design. Failure to submit a proposal on time will reduce your paper grade by one-half grade (e.g., from an A to an A-). Changes in topic after November 11 require a justification and a revised proposal.

You are welcome to choose a policy area relevant to your APA, but the discussion of that area in your paper should be oriented toward the topics covered in this course.

## Course Readings

**Textbooks:** We will use the following textbook for assigned readings:

Angrist, J. D., & Pischke, J. S. (2014). *Mastering 'Metrics: The Path from Cause to Effect*. Princeton University Press.

This book is available at the [Cal Student Store](#), for purchase online ([Amazon](#), [Google Books](#)) or for rent ([Chegg](#)). You may also access an electronic copy through the UC Berkeley library system.

In addition, for background readings, you can check:

Cunningham S. *Causal Inference: The Mixtape*. (2021). Yale Press.

Gerber A.S., Green D.P. *Field Experiments: design, analysis and interpretation*. (2012). W.W Norton & Company.

Glennester R., Takavarasha K. *Running randomized evaluations: a practical guide*. (2013). Princeton University Press.

I also suggest these free online resources:

Cunningham S. *Causal Inference: The Mixtape*. (2021). Yale Press. Online resources [here](#). These resources provide applied examples using STATA, R and Python codes.

For randomized control trials: JPAL has excellent educational resources [here](#).

For more advanced resources, see 2020 AEA Continuing Education Webcasts “Mastering Mostly Harmless Econometrics” (with Alberto Abadie, Joshua Angrist, and Christopher Walters), [here](#), where you can download videos and slides.

**Journal articles:** Journal articles that are required reading are listed below with a link to them. You can also access them online via the library.

### Detailed schedule

<i>Date</i>	<i>Topic</i>
8/24 (W)	1. Introductions and course overview
8/29 (M)	2. Statistical Inference: A review (1/2)
8/31 (W)	3. Statistical Inference: A review (2/2)
9/5 (M)	<i>Labor Day – no class</i>
Unit 1: Observational studies: Regressions	
9/7 (W)	4. Descriptive analysis: an application to the measure of Black-White inequality
9/12 (M)	5. Guest speaker: Ellora Derenoncourt on the Racial Wealth Gap
9/14 (W)	6. Oaxaca-Blinder decompositions: application to Chetty et al. (2020)
9/19 (M)	7. Regressions and omitted variable bias
Unit 2: Randomized Control Trials	
9/21 (W)	8. RCTs fundamentals: the potential outcome framework
9/26 (M)	9. RCTs fundamentals: dealing with noncompliance
9/28 (W)	10. Guest Speaker: Patrick Kline on Systemic Discrimination Among Large U.S. Employers
10/3 (M)	11. RCTs: How and when to randomize (cluster, subgroup analysis)
10/5 (W)	12. RCTs: Power analyses
10/10(M)	13. Guest Speaker: Edward Miguel on twenty years of experience in deworming
10/12(W)	14. RCTs: Threats and generalizability
10/17(M)	<i>no class</i>
Unit 3: Quasi-experiments	
10/19(W)	15. Instrumental variables
10/24(M)	16. Guest Speaker: Nina Roussille on Worker Beliefs About Outside Options
10/26(W)	17. Panel Data and DiD: Basics
10/31(M)	18. DiD & Bunching Design: application to Derenoncourt & Montialoux (2021)
11/2 (W)	19. Event Study Designs
11/7(M)	20. Guest Speaker: Jesse Rothstein on School Finance Reforms
11/9 (W)	21. DiD: Recent Advances
11/14(M)	22. DiD: application to the effects of the minimum wage in Brazil
11/16(W)	23. Regression Discontinuity Designs
11/21(M)	24. Wrapping up – a review of all methods
11/23(W)	<i>Thanksgiving – no class</i>
11/28(M)	25. Guest Speaker: Susan Sepanik on evaluation at MDRC
11/30(W)	26. Connecting evaluation and the policy process & conclusion
12/5(M)	<i>RRR week – no class</i>
12/7 (W)	<i>RRR week– no class</i>

## Weekly Readings

I'll also provide a detailed bibliography at the end of each lecture slides.

Lecture 1 (8/24) – Introductions and course overview

Hull, P. Kolesar M. and Walters C. (Forthcoming), “Labour by Design: Contributions of David Card, Joshua Angrist, and Guido Imbens”, *Scandinavian Journal of Economics*. [\[Link\]](#).  
Saez E. (2021), “Public Economics and Inequality: Uncovering our Social Nature”, AEA Distinguished lecture, *American Economic Association, Papers and Proceedings*, 111, 1-26. [\[Link\]](#).

Lectures 2 & 3 (8/29 & 8/31) – Statistical Inference: A review

\* *Mastering Metrics*, Appendix of Chapter 1 (pp. 33-46)  
Gu J. and Walters C. (2022), “Empirical Bayes Methods: Theory and Application”, NBER Methods Lectures. [\[Link\]](#).

### **Unit 1: Observational studies: Regressions**

Lecture 4 (9/7) – Descriptive analysis: an application to the measure of Black-White inequality

\* *Mastering Metrics*, Chapter 1 (pg. 1-14)  
\* Bayer, P. and Charles K., “Divergent Paths: A New Perspective on Earnings Differences Between Black and White Men Since 1940”, *Quarterly Journal of Economics*, Volume 133, Issue 3, pp. 1459–1501. [\[Link\]](#).

Lecture 5 (9/12) – Guest speaker: Ellora Derenoncourt

\* Derenoncourt, E. Kim C., Kuhn M., Schularick M. (2022), Wealth of two nations: The U.S. racial wealth gap, 1860-2020, *Working Paper*. [\[Link\]](#). [\[Non-technical Summary\]](#).

Lecture 6 (9/14) – Oaxaca-Blinder decompositions: application to Chetty et al. (2020)

\* Chetty, R., Hendren, N., Jones M., Porter S.. “Race and Economic Opportunity in the United States: an Intergenerational Perspective”, *Quarterly Journal of Economics*, Volume 135, Issue 2, May 2020, pp. 711–783. [\[Link\]](#).

Lecture 7 (9/19) – 7. Regressions and omitted variable bias

\* *Mastering Metrics*, Chapter 2 (pp. 47-79)

### **Unit 2: Randomized control trials**

Lecture 8 (9/21) – RCTs fundamentals: the potential outcome framework

\* *Mastering Metrics*, Chapter 1 (pp. 1-30)

Lecture 9 (9/26) – RCTs fundamentals: dealing with noncompliance

\*Duflo, E., Glennerster, R., & Kremer, M. (2007). Using randomization in development economics research: A toolkit. *Handbook of development economics*. Section 6.2. [\[Link\]](#).

Lecture 10 (9/28) – Guest speaker: Patrick Kline

\*Kline P., Rose E., Walters C. (forthcoming), “Systemic Discrimination Among Large U.S. Employers”, *Quarterly Journal of Economics*. [[Link](#)]. [Non-technical Summary ([video](#))].

Lectures 11 & 12 (10/3 & 10/5) – How and when to randomize and power analyses

\*Duflo, E., Glennerster, R., & Kremer, M. (2007). Using randomization in development economics research: A toolkit. Handbook of development economics. Sections 3-5. [[Link](#)].

Lecture 13 (10/10) – Guest speaker: Edward Miguel

\*Joan H., Miguel E., Walker M., Kremer M., and Baird S., “Twenty years economic impacts of deworming” *Proceedings of the National Academy of Sciences*, 118(14). [[Link](#)].

Lecture 14 (10/12) – Threats and generalizability

\*Duflo, E., Glennerster, R., & Kremer, M. (2007). Using randomization in development economics research: A toolkit. Handbook of development economics. Sections 7-8. [[Link](#)].

### **Unit 3: Quasi-experiments**

Lecture 15 (10/19) – Instrumental variables

\* *Mastering Metrics*, Chapter 3 (pg. 98-139)

Lecture 16 (10/24) – Guest speaker: Nina Roussille

Jäger S., Roth C. and Schoefer B. “Worker Beliefs About Outside Options”, *Working Paper*. [[Link](#)].

Lecture 17 (10/26) – Panel Data and Difference-in-differences: Basics

\* *Mastering Metrics*, Chapter 5 (pg. 178-208)

Lecture 18 (10/31) – DiD & Bunching Design: application to Derenoncourt & Montialoux (2021)

\*Derenoncourt, E. and Montialoux C. (2021), “Minimum wages and racial inequality”, *Quarterly Journal of Economics*, 136(1):169-228. [[Link](#)].

Lecture 19 (11/2) – Event Study Designs

Jacobson L., LaLonde R. and Sullivan D. (1993) “Earnings Losses of displaced workers”. *American Economic Review*, vol. 83, No. 4, pp. 685-709.

Lecture 20 (11/7) – Guest speaker: Jesse Rothstein

\*Lafortune J., Rothstein, J. and Schanzenbach D. (2018) “School Finance Reform and the Distribution of Student Achievement”, *American Economic Journal: applied economics*, vol. 10, no.2, pp. 1-26. [[Link](#)].

Rothstein, J. and Schanzenbach D. (2022) Does Money Still Matter? Attainment and Earnings Effects of Post-1990 School Finance Reforms, *Journal of Labor Economics* 40 (S1).

Lecture 21 (11/9) – Difference-in-differences: Recent Advances

Roth J., Sant'Anna P., Bilinski A., and Poe J. (2022), “What's trending in DiD?”, *Working Paper*. [[Link](#)].

Lecture 22 (11/14) – DiD: application to the effects of the minimum wage in Brazil

\*Derenoncourt, E., Gerard F., Lagos L., and Montialoux C. (2021) “Racial Inequality, Minimum Wage Spillovers, and the Informal Sector”, *Working Paper*. [[Link](#)].

Lecture 23 (11/16) – Regression Discontinuity Designs

\* *Mastering Metrics*, Chapter 4 (pg. 147-175)