PPOL 561
Accelerated Statistics for Public Policy II

Spring 2021

Instructor

Professor: Eric Dunford

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Course Description

This is the second course in the two-course sequence on quantitative methods for social science. The course builds on students' understanding of multivariate regression and introduces advanced, but commonly used, methods of statistical analysis. The course is broadly divided into two part: causal inference and advanced modeling. Instruction will concentrate on how to determine the appropriate econometric approach in addressing various types of policy questions, while highlighting the challenges in isolating causal effects. The emphasis is on applied learning; formal proofs and mathematical rigor are presented but not the principal focus of the course. This course will be taught using `R`. As part of our effort to teach effective communication skills, students will make presentations about applications using the techniques being studied in class.

Course Objectives

By the end of the semester students should be able to

1. understand the challenges and modeling approaches to isolating causal effects;
2. understand and implement advanced statistical techniques, such as limited dependent variable models (binary, ordered, and multinomial outcomes), selection models, and panel models;
3. use `R` to conduct data manipulation and advanced statistical analysis; and
4. effectively communicate statistical analysis and present publication-quality tables and graphics.

Time and location

Classes will be held *virtually* on **Tuesdays** from ***9:30am to 12:00am***:

- January 25
- February 2, 9, 16, 23
- March 2, 9, 16, 23, 30
- April 6, 13, 20, 27
- May 4

Holidays/Breaks (No class):

- March 30 (Spring Break)

Note that this class is scheduled to meet weekly for 2.5 hours. However, the instructor will aim to keep the class in session for 2 hours (leaving the last 30 minutes of class open for questions/office hours/discussion). Five minute breaks will be taken approximately every 40-45 minutes.

Recitation will be held most weeks on XXXX from *X:XXpm to X:XXpm* via Zoom. Attendance is required. A complete schedule of recitation dates can be found on the class website (see "Lab Schedule" tab @ http://ericdunford.com/ppol561/#course_outline). Please use the link to the virtual classroom when meeting for the recitation.

Virtual Classroom. We will use **Zoom** (a web-conferencing platform) to hold class each week. Class will meet at its regularly scheduled time each week for synchronous lectures. If you do not have Zoom, you can download it **here** prior to the start of class.

Students will use this link to access the live Zoom call for lecture. ***If the link breaks or does not function properly, please check the `#general` channel on Slack for information regarding the new link. If there is no message regarding a new link, please contact the professor and/or TA via Slack.*** All lecture material will be recorded and posted to Canvas each week.

Required Materials

Readings: We will rely primarily on the following text for this course.

- Bailey, Michael (2016). Real Stats: Using Econometrics for Political Science and Public Policy. Oxford University Press.
- Additional readings may be posted for each class and can be found on the course website. Most reading material can be found on the class Canvas site.

Class Website: A class website (www.ericdunford.com/ppol561) will be used throughout the course and should be checked on a regular basis for lecture materials and required readings.

Class Slack Channel: The class also has a dedicated slack channel (ppol564-foundations.slack.com). **Please note that this is the same channel used in PPOL564**. The channel serves as an open forum to discuss, collaborate, pose problems/questions, and offer solutions. Students are encouraged to pose any questions they have there as this will provide the professor and TA the means of answering the question so that all can see the response. If you're unfamiliar with, please consult the following start-up tutorial (https://get.slack.help/hc/en-us/articles/218080037-Getting-started-for-new-members). Please follow the ***invite link*** to be added to the Slack channel.

Canvas: A Canvas site (http://canvas.georgetown.edu) will be used throughout the course for readings and assignments. All readings and assignments will not be distributed in class or by e-mail. Support for Canvas is available at (202) 687-4949

Computing: Programming task for in-class activities and assignments will be conducted using `R`. Students are strongly encourages to utilize Rstudio, which offers an accessible and widely-utilized graphical user interface for programming in `R`.

NOTE: In-class activities will include programming in `R`. If you do not have access to a laptop on which you can install `R` and `Rstudio`, please contact the professor and/or TA for assistance.

Course Requirements

Assignment	Percentage
Attendance	5%
Presentation	10%
Problem sets	25%
Midterm exam	30%
Final exam	30%

Note that the grades on Canvas are not weighted, and thus, may not accurately reflect a student's final grade.

Problem Sets (25%): There will be 7 assignments throughout the course of the semester. Homework assignments are available in the assignments folder in Canvas. They are due at the beginning of class on the days indicated rendered as a `.pdf` from an RMarkdown file.

For the first 6 assignments, students may pick 4 to count toward their grade. In other words, students are only required to complete 4 assignments. All students are required to complete Assignment 7.

You are strongly encouraged to work on these problem sets in study groups; however, ***each student must prepare and submit his or her own write-up for each problem set*** (including *concise* `R` programs and output when appropriate). I will provide solutions for the problem sets after they are turned in.

Assignment	Date Assigned	Date Due
No. 1	February 2	February 9
No. 2	February 23	March 2
No. 3	March 2	March 9
No. 4	March 9	March 16
No. 5	March 16	March 23
No. 6	April 13	April 20
No. 7	April 27	May 4

Presentation (10%): The presentation is a 10 minute in-class presentation with slides on a paper related to the material we are discussing. These presentations will be done in teams of two, which have been randomly assigned (See below). Each team will be responsible for locating a research paper published in a peer-reviewed journal. Students will be graded individually although there will likely be a high correlation between grades within the teams. Note that given the odd number of students in the class, one student will have to present alone.

This presentation should summarize the substantive and statistical issues addressed in the paper and provide context and a critique. This is a lot to do and in most cases the presentation will have to isolate and discuss only one element of the paper. ***A team representative must email me a copy of the presentation the day before your scheduled time.***

The presentation schedule for the Spring 2021 semester is as follows:

Group	Partner_1	Partner_2
1	Ella Zhang	Sahithi Adari
2	Fangzi Wang	Maryam Khalid Shah
3	Tianhui Cao	Madeline Kinnaird
4	Alexander Adams	Harshini Tammareddy
5	Merykokeb Belay	Lexi Gu
6	Charlie Zhang	Gloria Li
7	Mary Kryslette Bunyi	Matthew Ring
8	Yousuf Abdelfatah	Zixun Hao
9	Justine Huynh	Vince Egalla
10	Ruyi Yang	Chau Nguyen

Note: Grades for the presentations will not be circulated until all students have presented. Doing so will ensure that grades appropriately reflect the performance distribution of the entire class.

Exams: There will be a midterm (30%) and final exam (30%). The midterm will be held in class on March 23rd and will primarily cover material covered the first 8 weeks of the course. The final will be held on May 17 from (9:00AM to 11:00AM). The final will be cumulative but will emphasize material covered the during the last portion of the course. The dates of the exams are fixed. I cannot accommodate flight schedules for the final exam; please be sure to plan accordingly. ***No practice exam will be offered*** (See "No Practice Exams" in Course Policies).

Grading:

Course grades will be determined according to the following scale:

Letter	Range
A	95% – 100%
A-	91% – 94%
B+	87% – 90%
B	84% – 86%
B-	80% – 83%
C	70% – 79%
F	$< 70\%$

How to Succeed

- **Come Prepared.** Do the readings. Think about the readings on their own terms, but also in terms of how the concepts apply to things you're interested in.

- **Ask Questions.** Formulating a question helps you engage with the material much more deeply. If you have a question, it's almost certain that others do too; asking a question will not only help yourself, but you will help others. Most importantly, asking questions helps keep the class on track. If there are lots of questions, we'll slow down and get things figured out. If there are few questions, we'll charge ahead.
- **Collaborate.** Work in groups, but do so wisely. Working with classmates is a great way to learn from each other. Often, classmates will have some way of explaining things that clicks for you. And, more often, the act of explaining something to someone else will make things click for you. This only works, though, if you prepare by yourself first. If you show up and wait for classmates to do the work, you can probably muddle through the homeworks, but you'll have trouble participating in classes and may fall behind as the material we cover cumulates and needs to be understood at each step.
- **Start homeworks early.** Sometimes the data doesn't cooperate; you don't want to find this out at 11pm the night before the homework is due. Also, the more you are doing homeworks, the more you will be able to follow the lectures.

Course Policies

Attendance/Participation

Participation is required in this course. Participation can be decomposed into attendance (class and recitation), engagement, and completing the class assignments. Specifically, I define "engagement" as:

- Asking questions and participating in class
- Paying attention to the professor during lecture
  - not looking at your computer screen for extended periods of time
  - never looking at your phone during class
- No side conversations during lecture/messaging/internet browsing, etc.

I reserve the right to deduct attendance points from students who are not participating as expected.

If absent, each student is responsible to make up the materials missed during a lecture on their own. All lecture recordings will be posted on Canvas and lecture notes + slides will be posted on the course website. Students who missed a lecture should reach out to their peers in the class for lecture notes. It is not the responsibility of the Professor/TA to fill absentee students in on any missed content.

Communication

- For private questions concerning the class, email is the preferred method of communication. All email messages must originate from your Georgetown University email

account(s). Please use a professional salutation, proper spelling and grammar, and patience in waiting for a response. The professor reserves the right to not respond to emails that are drafted inappropriately. ***Please email the professor and the TA directly rather than through the Canvas messaging system.*** Emails sent through Canvas will be ignored.

- For general, class-relevant questions, `Slack` is the preferred method of communication. Please use the general or the relevant channel for these questions.
- I will respond to all emails/slack questions within 24 hours of being sent during a weekday. I will not respond to emails/slack sent late Friday (after 5PM) or during the weekend until Monday (9AM). Please plan accordingly if you have questions regarding current or upcoming assignments. Please address the professor and TA by their last name unless stated otherwise.

Electronic Devices

The use of laptops, tablets, or other mobile devices is permitted *only for class-related work*. Audio and video recording is not allowed unless prior approval is given by the professor. Please mute all electronic devices during class.

Assignments and Late Work

Assignments should be clear, legible, and submitted in the required format. Writing assignments will be graded on the basis of content, logic, analysis, mechanics, organization, and research. Due dates for all assignments will be posted on Canvas and are non-negotiable. Exceptions to this policy will be made only under extremely unusual circumstances and will require valid documentation from the student. ***Late problem sets will be penalized a letter grade per day.***

Proof of Diligent Debugging

When reaching out to the professor or teaching assistant regarding a technical question, error, or issue you ***must*** demonstrate that you made a good faith effort to debugging/isolate your problem prior to reaching out. In as concise a way as possible, send a record of what you tried to do along with a reproducible example emulating the error. As software is continually being refined in data science and new approaches continually emerge and changing, learning how to frame your question and find a similar solution online is a key tool for success in this domain. If you make a diligent effort beforehand to solve your problem, we will do the same in trying to help you figure out a solution. Note that the ***professor/TA is a resource of last resort***: only come to them after you've exhausted all other options.

No Practice Exams

Most data analytic jobs now require that you perform a task or take a test. There is no practice test for these exams. You know what you know, and you're either able to implement it or not. Moreover, life rarely offers us a chance to practice before being tested. As such, there are no practice exams in my class. Students will be given a study guide for exams that broadly outlines topics that might be on the exams. Students are encouraged to talk with the professor and TA during office hours about the exam, but no example questions will be offered.

Use of Class Materials

Increasingly, with the proliferation of certain websites, questions about the ownership of course materials have arisen (and Georgetown is actively working on policies to address these concerns). I consider my syllabus, lectures, handouts, problem sets, and problem set answers to be my intellectual property. I respectfully request that you refrain from sharing my materials in any electronic (or paper) format. You are welcome to record my lectures for your own use, but they should not be posted anywhere. Sharing notes, on an occasional basis, with others in the class is fine as long as they are not posted elsewhere online. Students found in breach of this policy will fail the course.

Academic Resource Center/Disability Support

If you believe you have a disability, then you should contact the Academic Resource Center (arc@georgetown.edu) for further information. The Center is located in the Leavey Center, Suite 335 (202-687-8354). The Academic Resource Center is the campus office responsible for reviewing documentation provided by students with disabilities and for determining reasonable accommodations in accordance with the Americans with Disabilities Act (ASA) and University policies. For more information, go to http://academicsupport.georgetown.edu/disability/.

Important Academic Policies and Academic Integrity

McCourt School students are expected to uphold the academic policies set forth by Georgetown University and the Graduate School of Arts and Sciences. Students should therefore familiarize themselves with all the rules, regulations, and procedures relevant to their pursuit of a Graduate School degree. The policies are located at:'http://grad.georgetown.edu/academics/policies/

Provosts Policy Accommodating Students Religious Observances

Georgetown University promotes respect for all religions. Any student who is unable to attend classes or to participate in any examination, presentation, or assignment on a given

day because of the observance of a major religious holiday (see below) or related travel shall be excused and provided with the opportunity to make up, without unreasonable burden, any work that has been missed for this reason and shall not in any other way be penalized for the absence or rescheduled work. Students will remain responsible for all assigned work. Students should notify professors in writing at the beginning of the semester of religious observances that conflict with their classes. The Office of the Provost, in consultation with Campus Ministry and the Registrar, will publish, before classes begin for a given term, a list of major religious holidays likely to affect Georgetown students. The Provost and the Main Campus Executive Faculty encourage faculty to accommodate students whose bona fide religious observances in other ways impede normal participation in a course. Students who cannot be accommodated should discuss the matter with an advising dean.

Statement on Sexual Misconduct

Please know that as a faculty member I am committed to supporting survivors of sexual misconduct, including relationship violence, sexual harassment and sexual assault. However, university policy also requires me to report any disclosures about sexual misconduct to the Title IX Coordinator, whose role is to coordinate the University's response to sexual misconduct.

Georgetown has a number of fully confidential professional resources who can provide support and assistance to survivors of sexual assault and other forms of sexual misconduct. These resources include:

Associate Director
Jen Schweer, MA, LPC
Health Education Services for Sexual Assault Response and Prevention
(202) 687-0323
jls242@georgetown.edu

Erica Shirley
Trauma Specialist
Counseling and Psychiatric Services (CAPS)
(202) 687-6985
els54@georgetown.edu

More information about campus resources and reporting sexual misconduct can be found at http://sexualassault.georgetown.edu.

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Course Calendar

Week	Date	Topic	Assignment	Presentation Group
1	January 26	Course Introduction & Research Design		
2	February 2	Data Wrangling & Presentation in R	Assignment 1 Assigned	
3	February 9	Introduction to Causal Inference	Assignment 1 Due	
4	February 16	OLS, Confounders, & Simulation		1
5	February 23	Panel Data & Difference-in-Difference	Assignment 2 Assigned	2
6	March 2	Instrumental Variables	Assignment 2 Due; Assignment 3 Assigned	3
7	March 9	Experiments	Assignment 3 Due; Assignment 4 Assigned	4
8	March 16	Regression Discontinuity	Assignment 4 Due; Assignment 5 Assigned	5
9	March 23	Midterm	Assignment 5 Due	
-	March 30	No Class; Spring Break		
10	April 6	Matching		6
11	April 13	Synthetic Control	Assignment 6 Assigned	7
12	April 20	Binary Outcomes	Assignment 6 Due	8
13	April 27	Ordered & Multinomial Outcomes	Assignment 7 Assigned	9
14	May 4	Selection	Assignment 7 Due	10
	May 17	Final Exam (9am - 11am)		

IMPORTANT: This syllabus is subject to change and may be amended throughout the course to reflect any changes deemed necessary by the professor. Any changes will be announced in-class or on Slack.