DSA 5031 Econometrics for DSA

Online Course - 1 Credit Hour

Summer 2021

Professor: Dr. Pallab Ghosh

Class Meets: Fully Online

Office: 422 Cate Center Drive (Cate 1)

Online Office Hours: Tu & Th 3 - 4 pm

Course Meeting Time and Office Hours:

Fully online. Office hours are on Tuesday and Thursday 3-4 pm. Weekly Zoom meeting details are shown in Canvas.

Email: Contact me through Canvas or send an email at *pallab.ghosh@ou.edu*.

Course Description:

The main goal of this course is to learn a set of econometrics tools that can be applied in empirical research related to economic issues. In most of the scenarios, the best possible way we can answer an economic question by performing a randomized experiment. However, often we cannot run a randomized control experiment because of ethical considerations and other restrictions. Also, monetary constraints play a big role. The course will emphasize applying different estimation techniques, or "quasi-experimental" methods, to establish causal relationships in observational data. Although we will learn different econometric methods, the class's formal requirements will consist primarily of problem sets requiring students to analyze real data in the hope that doing applied work will help you learn the theory behind it.

Textbook

Michael Bailey, "real econometrics", 2nd Edition. Oxford University Press.

Statistical Analysis Software

I recommend that students use Python, R, or Matlab because you can easily perform any matrix operations. However, it is not required that you will use any of the above-listed software. Note that if you want, you can use Stata, Julia, SAS, SPSS, Gauss, or any other statistical software

Table 1: Weights of Homeworks and Project

Index	Weights
3 Problem Sets	60%
Research Project	40%

for your homework and class project. I will be able to read your codes from any of those listed software to verify the final output. It's completely your decision to choose the right statistical software for you. I will use either Python or Matlab in making the solution keys to the problem set questions.

Course Format

The course is delivered in an online format, consisting of lecture notes, readings of journal articles, problem sets involving real economic issues, and a research project. Besides, for each estimation method, I will upload a video lecture in Canvas.

Course Grades:

Your course grade will be based on (i) three homework assignments and (ii) an independent research project. The weights for these two parts are listed in Table 1. Homework assignments will contain both analytical questions and real data analysis by using statistical software.

Grading Scale:

Exams and problem sets will be scored numerically. The following grading scale will be used to determine your letter grade for DSA 5031

A : 90 - 100   B : 80 - 89.99

C : 70 - 79.99   D : 60 - 69.99

F : 0 - 59.99

I believe in horizontal equity: all students who receive the same numerical grade will receive the same letter grade (i.e., a 90 will not be a B for one student and an A for another). I also believe in vertical equity: higher numerical grades will (obviously) correspond to higher letter grades. After grading is complete, identical adjustments may be made to everyone's grade if the median score is lower than expected.

Course Calendar:

The course is organized into the following three broad estimation topics:

I. **Basic Research Design**: Statistical Inference, Causal Reasoning, Ordinary Least Square, Quantile Regression.

II. **Selection Based on Unobservable**: Differences-in-Differences (Diff-in-Diff), Regression Discontinuity (RD) Design.

III. **Selection Based on Observable**: Propensity Score Matching, Counterfactual Analysis.

As shown above, the course coverage will be split into three sections and we will cover each section in two weeks.

- There will be a homework assignment in every two weeks.

- In Canvas I will upload the homework solution key right after the due date of each HW.

- The research paper is due at the end of the semester.

Please see Table 2 for detailed class schedule.

Research Project:

You need to submit a small research project which consists of 40% of your final grade. The most important part of the project is to find a good research question. Think about a current economic issue that excites you. To find an interesting question, you may look at the Economist, New-York Times, and Wall Street Journals. The next step would be to find the data. I would recommend you open an account in the CPS (Current Population Survey) and IPUMS USA data sources. These data sources contain the entire US population's survey data and are maintained by the Bureau of Labor Statistics. You can also obtain your data from any other data sources that work for you.

Once you obtain the relevant data, think about what estimation method would be most appropriate to establish a causal relationship between the variable of interest and outcome variable. I expect you to submit a **5-6 pages (not more than 1200 words)** report where you need to address the following questions:

1. What is the research question?

2. Why is that research question important?

3. What is the identification strategy? and why do you choose that?

4. Main empirical findings and conclusion.

Homework:

There will be three problem sets, which will consist 60% of the final grade. That is, each problem set will count 20% of the final grade. Homework assignments will be based on both analytical questions and real data analysis by using statistical software. I expect you to produce very high-quality tables and figures showing the major results of these analyses. Please note that you will be required to submit all programs used in generating your results. Your answer keys will not be accepted unless you submit the codes that produce the reported results. As a graduate student, I expect you to handover your homework assignments in a **professional PDF outlet by using the software LaTex**.

Note that I will not accept your HW answer key after the due date with no exception because I will upload the solution keys of a problem set in Canvas right after the due date. You are always welcome to submit your HW earlier than the due date

Table 2: Class Schedule

Part	Week	Date	Study Topic	Study Topic
Unit 1:	**Basic Research Design**			
	W1	June 14-18	Statistical Inference	Causal Reasoning
	W2	June 21-25	Ordinary Least Square	Quantile Regression
	PS 1 (Basic Research Design): **Due June 25**			
Unit 2:	**Selection Based on Unobservable**			
	W3	June 28-July 2	Method: Diff-in-Diff	Application: Diff-in-Diff
	W4	July 5-9	Method: RD Design	Application: RD Design
	PS 2 (Selection Based on Unobservable): **Due July 9**			
Unit 3:	**Selection Based on Observable**			
	W5	July 12-16	Method: PS Matching	Application: PS Matching
	W6	July 19-23	Method: Counterfactual Analysis	Application: Counterfactual Analysis
	PS 3 (Selection Based on Observable): **Due July 23**			

COURSE POLICY ON ACADEMIC INTEGRITY:

Cheating is strictly prohibited at the University of Oklahoma. As a member of the OU community it is your responsibility to protect your educational investment by knowing and following the rules. Should you see someone else engaging in this behavior, I encourage you to report it to myself or directly to the Office of Academic Integrity Programs. That student is devaluing not only their degree, but yours, too. Be aware that it is my professional obligation to report academic misconduct, which I will not hesitate to do. Sanctions for academic misconduct can include expulsion from the University and an F in this course, so don't cheat. It's simply not worth it. For specific definitions on what constitutes cheating, review the Student's Guide to Academic Integrity at http://integrity.ou.edu/students_guide.html.

REASONABLE ACCOMMODATION POLICY:

Students requiring academic accommodation should contact the Disability Resource Center for assistance at (405) 325-3852 or TDD: (405) 325-4173. For more information please see the Disability Resource Center website http://www.ou.edu/drc/home.html Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

RELIGIOUS OBSERVANCE:

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty.

TITLE IX RESOURCES AND REPORTING REQUIREMENT:

For concerns regarding gender-based discrimination, sexual harassment, sexual misconduct, stalking, or intimate partner violence, the University offers a variety of resources, including advocates on call 24/7. To learn more or to report an incident, please contact the Sexual Misconduct Office at 405-325-2215 (8 to 5, M-F) or OU Advocates at 405-615-0013 (24/7). For more information, please see http://www.ou.edu/eoo.

ADJUSTMENTS FOR PREGNANCY/CHILDBIRTH RELATED ISSUES:

Should you need adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact me or the Disability Resource Center at 405/325-3852 as soon as possible. http://www.ou.edu/eoo/faqs/pregnancy-faqs.html