

PPHA 58001 Data Analytics I: Quantitative Analysis

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Harris School of Public Policy
University of Chicago

Professor Yukiko Asai
yasai@uchicago.edu

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Course Description and Goals

This class will provide an introduction to quantitative analysis for public policy. Much of the class is devoted to learning about the effects of policies and answering empirical, policy-relevant questions from observational data. In doing so, the course provides an introduction to critical, quantitative thinking in general.

Students will be introduced to the basic toolkit of policy analysis, which includes sampling, hypothesis testing, regression, experiments, difference in differences, and regression discontinuity. Students will also learn how to use a statistical software program to organize and analyze data. More importantly, students will learn the principles of critical thinking essential for careful and credible policy analysis.

Learning objectives for the course:

- ✓ Acquire a toolkit for policy analysis.
- ✓ Understand how to consume quantitative evidence responsibly, critically, and skeptically.
- ✓ Acquire foundational statistical programming skills.
- ✓ Produce quantitative evidence responsibly, critically, and skeptically.

To achieve these goals, we are going to develop rigorous statistical thinking and quantitative reasoning skills that will allow you to make appropriate inferences from data. We will develop a powerful toolkit for conducting quantitative analysis, and that toolkit is going to serve as a foundation for even more sophisticated tools that you will build upon in Data Analytics II and your other courses at Harris.

Weekly classes

We will be meeting in person at “1871 Innovation Hub” from Thursdays 6:00-8:50pm each week. Each class will be recorded using Zoom and posted on Canvas within 24 hours. Our 3-hour class will typically be composed of the following:

1. Lecture
2. Practice problems
3. Group discussion and breakout sessions
4. In class R exercise

The lecture slides will be posted on Canvas in advance of class to enable students taking notes on the slides. Please keep in mind that not all information will be pre-written on the lecture slides. As such, it is advised that students actively take notes during class. If you are unable to attend class, you are advised to view the

lecture recording after it is posted on Canvas and meet with the professor or the TA to further discuss the material. Please note that unless you have a prior accommodation from Student Affairs, you will be unable to join the class virtually through Zoom.

Teaching Assistant Office Hours and R Bar

Each week the Teaching Assistant will offer an Office Hour / R Bar on Saturdays at 9:30am-11:00am. You can use this time to further your skills using R as well as to ask questions about the class material and assignments. The first hour will be a guided lecture where the TA will cover examples in R. This will be recorded and provided on Canvas. The remaining time will be open office hours where anyone can join and ask questions.

Textbook and Readings

Bueno de Mesquita, Ethan and Anthony Fowler. 2021. Thinking Clearly with Data.

We will use the statistical software R for this class. Students are not expected to have any experience using statistical software or writing code prior to the course. Students will need to use R in order to complete the assignments. To help students learn R and provide hands-on practice conducting data analysis, I will often work in R during course sessions. For many students, it is helpful to work in R at the same time. I will provide the relevant R files on Canvas for students to access. Throughout the course, I may assign several applied readings, usually consisting of short news articles or research papers. You are responsible for doing ALL assigned readings before class.

Grading and Class Deliverables

Your final grade will be weighted as follows:

Practice Problems Completion 10%
 Problem Sets 35%
 Mid-Quarter Quiz 10%
 Work Memo 20%
 Final Exam 25%

The final letter grade received will be based on the distribution of grades in the class. The cutoffs may be moved down to adjust for the final distribution of the class grades. The grades will be distributed as follows (Standard Curve for Harris Core Courses):

A	A-	B+	B	B- and below
1/8	1/4	1/4	1/4	1/8

1) Practice Problems Completion

After attending lecture each week, each student will complete several practice problems via Canvas' quiz function. These problems will be multiple choice, and are graded on the basis of completion only. Answers will be provided and students should feel free to discuss the questions with the TA and instructor during office hours. These problems should be completed on Canvas before the start of the following lecture on Thursday. The purpose of this assignment is to offer you a low-stakes way to self-assess your understanding of the material, and to help guide you in your study.

2) Problem Sets

There are three assignments throughout the quarter. I will provide the instructions for each assignment at least 10 days prior to the due date. You may discuss problem sets and work out solutions together with other classmates. However, you should write your own solutions and perform calculations independently. All assignments should be submitted through the course website (Gradescope) in PDF format by 11:59pm on the stated due date. Please also attach any relevant R files in PDF format. All assignments should be formatted in a professional way, as if you were presenting them to a boss, client, or colleague. If there is any confusion about the instructions or materials, it is permissible to ask specific and clarifying questions about an assignment. In addition, these assignments will be graded anonymously, so please do not write any identifying information (such as your name) on the assignment.

3) Mid-Quarter Quiz

Rather than taking a midterm exam, you will take a short quiz in week 7. The goal of this quiz will be to help the students get feedback about their own performance in a timed situation. It will also provide feedback to the instructor for the second half of the quarter.

4) Work Memo

This memo is an opportunity to bring in the work that you are currently doing at your job to the classroom and the sphere of data analytics. You will first describe a current issue being faced in your workplace (whether it is a specific policy being considered, a resource allocation problem, an issue being raised by a client, or a planning consideration being taken by leadership for example). Then you must discuss how data analysis could contribute to solving this issue, what type of data you might need and how to gain access to this data, what complications and complexities should be considered, and suggest what type of analysis should be conducted (difference-in-difference, matching, randomization, correlation analysis, etc). A rubric and guiding questions for this assignment will be posted on Canvas.

5) Exam

There will be a timed final exam at the end of the quarter. The exam will be administered remotely. You may use any of your notes taken during the class as well as any resources posted on the course Canvas site. The use of other online resources is forbidden. Students need to upload their answers before the deadline.

Late Work

All assignments will be posted sufficiently far in advance of the due date (at least 10 days) to provide students with ample time for completion. A late assignment will be penalized by a 20% grade reduction if it is submitted within 24 hours of the due date/time. Assignments will not be accepted more than 24 hours after the due date/time. Keep in mind that delayed submission of assignments results in delayed posting of suggested solutions, which negatively impacts your classmates.

Contesting a Grade

If you would like to contest a grade, you must do so in writing within one week of receiving your grade for that assignment or exam. Please follow the following process for contesting a grade:

- Submit a regrade request on Gradescope and include your reasoning for why you are requesting a re-grade referencing the suggested solutions.
- The TA will respond by re-grading your entire assignment or exam according to their grading rubric. Note that this could result in your grade going up, going down, or staying the same.

- If you choose not to accept the TA's response and re-grade, then you may forward your request to the professor who will then do a final re-grade of your assignment or exam.

Missed Exams

If you miss an exam without a valid, approved excuse, you will receive zero credit for the exam. All missed exams must be approved by program administrator and the course instructor. After this approval, we will set up an alternate time and location to administer the final exam. Should you know of a reason why you may have a conflict with the final exam, please let us know as soon as possible.

Emails

If you have an administrative question about the course (e.g., grading, deadlines, requirements, procedures, etc.) that applies to all students but is not answered on the syllabus, please ask it in class. If the question is personal in nature, email me. If you have an intellectual/academic question, ask it in class; other students will likely benefit from it.

Class Conduct and Professionalism

Students are expected to act with professionalism and respect throughout this course. This includes, but is not limited to: being on time to class and for any outside-the-classroom study group meetings and office hours, not using cell phones in class, and generally acting in a fashion consistent with professional expectations. You may use your laptop or tablet in class to take notes or consult readings, but please keep your usage limited to class-relevant materials.

Academic Integrity

All University of Chicago students are expected to uphold the highest standards of academic integrity and honesty. Among other things, this means that students shall not represent another's work as their own, use un-allowed materials during exams, or otherwise gain unfair academic advantage. All students suspected of academic dishonesty will be reported to the Harris Dean of Students for investigation and adjudication. The disciplinary process can result in sanctions up to and including suspension or expulsion from the University. In addition to disciplinary sanctions, the student will receive a grade of 0 on the exam or problem set in question and cannot earn higher than a B- in the course, regardless of their performance on other assignments and exams.

The Harris policy and procedures related to academic integrity can be found at <https://harris.uchicago.edu/gateways/current-students/policies>.

The University of Chicago Policy on Academic Honesty Plagiarism can be found at <https://studentmanual.uchicago.edu/academic-policies/academic-honesty-plagiarism/>

Please note that these expectations apply to all assignments and deliverables in this class, in which your submitted work represents your commitment that it is your own independent work and that you have relied on no other individuals or resources, except as explicitly specified in the assignment instructions, in producing this work. I might also note that any chart, graph, or table you create should also contain complete source information as indicated. I encourage any students with specific questions regarding attribution, citations, etc. to contact me directly.

Diversity and Inclusion

One of my main teaching goals is to work towards presenting materials and activities that are respectful of diversity: gender, sexuality, age, disability, ethnicity, socioeconomic status, and culture. Our aim is that students from all diverse backgrounds and perspectives be well supported and served by this course, and that the diversity that students bring to this class be viewed as a strength and as a resource. 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, while I expect there to be rigorous discourse during our class discussions, I ask that you engage with care and empathy for the other members in the classroom.

Accommodations for Students with Disabilities

The University of Chicago seeks to provide an environment conducive to learning, teaching, working, and conducting research that values the diversity of its community. The University strives to be supportive of the academic, personal, and work-related needs of each individual and is committed to facilitating the full participation of students with a disability in the life of the University. Students with a disability, particularly those that require an accommodation, should contact Student Disability Services (<https://disabilities.uchicago.edu/>). Upon receiving a letter of accommodation, please notify myself and your assigned academic adviser and we will coordinate to make arrangements.