PP 5376 Applied Quantitative Methods
Wednesday 4:00-6:30 pm, HTB 317
Fall 2023
School of Public Policy, University of Connecticut

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Office Hours: Tuesday 1:30-2:30 pm or by appointment

Course Description

This course will provide you with the application of the tools and methods of applied quantitative methods. The first part of the course will focus on statistics, including descriptive statistics, probability theory, statistical inference, and hypothesis testing. The second part covers the basics of research design, including theory and causation, concepts and measurements, experimental designs, and best practice research. The course will also introduce you to using Excel to analyze quantitative data in social science research. This course will prepare you for more advanced quantitative research methods courses, including PP 5331 Quantitative Methods for Public Policy and PP 5370 Applied Research Design.

Course Objectives

After taking the class, students should gain the following:

- Ability to effectively present data.
- Ability to conduct basic statistical analysis.
- An understanding of the logic of social research.
- An understanding of the application of concepts of evaluation research.

Textbooks and Readings

There are no required textbooks. The following books are recommended only. All other readings (e.g., journal articles, book chapters, and lecture notes) can be downloaded from the course website on HuskyCT. Lecture notes are required; other readings are optional.

Meier, Kenneth J; Brudney, Jeffrey L.; Bohte, John. 2015. *Applied Statistics for Public and Nonprofit Administration, 9th Ed*. Stamford, CT: Cengage.

Sanjiv Jaggia; Alison Kelly. 2022. *Business Statistics: Communicating with Numbers*, *4th Edition*. McGraw Hill.

Statistical Package and Course Communication

We will use Excel for the statistical analysis. You are responsible for having Excel

installed on your laptops by the ***second*** week of class. Excel is free for UConn students. Check here for the version suitable for your devices: https://software.uconn.edu/microsoft-products-students/

We will use the course website on HuskyCT. Please make sure to check it for announcements regularly. All questions should be emailed to jinhai.yu@uconn.edu. Please put the course number in the subject line. Make sure to use your university email addresses. As graduate students, your email should be written professionally. You can expect responses within **two** business days on weekdays. Emails during weekends will typically be replied to on the following Mondays. Grading and feedback will typically be returned within one week.

Evaluation Criterion

Your grade will be determined as follows.

Assignment	**Points**	**Due dates**
Problem set 1	19	10/22
Problem set 2	18	11/12
Problem set 3	10	12/3
Concept quizzes (11 quizzes at 3 points)	33	See below
Group project STAR	20	12/6
Total	100	

Note: All assignments are due at 12:00 pm EST on Sundays except on 12/6.

Grading Scale

Grade	Letter Grade	GPA
93-100	A	4.0
90-92	A-	3.7
87-89	B+	3.3
83-86	B	3.0
80-82	B-	2.7
77-79	C+	2.3
73-76	C	2.0
70-72	C-	1.7
67-69	D+	1.3
63-66	D	1.0
60-62	D-	0.7
<60	F	0.0

Letter of Introduction

Before the second week of class, please write a one-page letter introducing yourself. You can include courses taken relevant to this class (e.g., statistics or research methods), your career goals, your expectations for this course, or any fun facts you would like to share. The letter will not be graded but is required. In addition, please make sure to add a professional photo to your user profile on the HuskyCT website.

Participation

I expect you to participate actively in class discussions. You can ask or respond to questions. By participating in class activities, you contribute to achieving the course goals. Lectures will be focused on fundamental concepts or applications. They can be abstract. Ask a question. Slow the class down. You may be doing your classmates a favor if they have similar questions.

Problem Sets

There will be ***three*** problem sets. Problem Set 1 covers descriptive statistics 1 & 2, probability, probability distributions, and normal distribution. Problem Set 2 covers sampling, confidence intervals, and hypothesis testing. Problem Set 3 covers experimental design, research design 1& 2.

Problem Sets 1&2 are designed to help you solve statistical problems by hand or using Excel. You will solve statistical problems similar to the examples in the course slides and the in-class examples. Problem 3 consists of several open-ended questions. You will be asked to identify two programs of interest, formulate research questions, develop hypotheses, and propose outcome/impact measures. These questions are intended to allow you to apply the research design techniques to a research problem of your choice.

Before working on the problem sets, ensure you understand the examples in the course slides and how they relate to the statistical concepts. Make sure to show the steps of how you solve the problems. In addition, I will walk you through some in-class examples with questions and solutions so that you can see how these questions are solved.

You should expect to spend extensive time and effort on these problem sets. They are not designed for you to complete in a few hours. You are strongly encouraged to start early. You may have time to work on problem sets in class. You should expect to work on them outside class as well. You are always welcome to ask me questions in class or by email.

Problem Set Grading

You can submit the problem sets either (1) as a group of no more than 3 students or (2) individually. If you submit the problem sets as a group, you must also submit a peer evaluation form. A team evaluation form will be distributed on HuskyCT. For the problem

sets submitted in groups, the team evaluation will count 20% of the grade, and the problem sets will count 80% of the grade. For the problem sets submitted by individual students, the problem sets will count 100%.

To ease your anxiety about working with numbers and getting the answers correct, I will adopt an "insurance" policy for grading the problem sets: You will get a minimum of B- if you submit answers to all the problem sets, regardless of whether your answers are technically correct.

Group Project (STAR)

Project STAR is an experimental study of the impact of class size on educational outcomes in Tennessee. You will be provided with the case material and the data set in Excel. You will use Excel to analyze the data (particularly, difference-in-means tests) to answer several questions. This is a group project. You must work in a group of no more than 4 students. You will analyze the data, present your results in class, and submit your slides. A detailed description will be posted on HuskyCT.

Concept Quizzes

We use short quizzes to assess your understanding of key concepts. The quizzes are open books/notes. You should ***not*** work in groups for the quizzes. You should complete the quizzes individually as if you were working on exams. I group the due dates of the quizzes by modules to avoid that you must attend to them every week, but you are encouraged to complete the quizzes as early as possible. Each student can take the quizzes ***up to twice*** until the due date. The higher grade of the two submissions will be used for your final score. To reduce your anxiety, I will ***drop*** one quiz with the lowest grade at the end of the semester.

The schedule of the quizzes is as follows:

No.	Concept quiz topics	Due dates
1	Descriptive statistics 1	9/24
2	Descriptive statistics 2	9/24
3	Probability	10/15
4	Probability distribution	10/15
5	Normal distribution	10/15
6	Sampling	11/5
7	Confidence intervals	11/5
8	Hypothesis testing	11/5
9	Experimental design	11/19
10	Research design 1	11/19
11	Research design 2	12/3

Late Assignments
Late assignments will result in a 10% reduction in the assignment grade. Please contact me ahead of time if there are any special circumstances. No late assignments will be accepted after the last day of class on December 6, 2023.

Grading Grievances
If you have any questions about your grade on an assignment, please wait until the next day after receiving your assignment before discussing the grade with me. There are no exceptions to this policy.

If you wish to have an assignment re-graded, please let me know within three business days after you receive it. If you ask for a grade change, you must provide specific, concrete written evidence for your request. This process can lead to your grades increasing or decreasing or staying the same. Generic concerns will not lead to a review of the grades. But I am happy to provide advice on how to improve in future assignments.

Class Courtesy
This is a graduate-level class for future public managers or policy analysts. I expect you to behave as *responsible professionals*. If you have a question, please raise your hands. Needless to say, whispering in class does not contribute to your own learning and is disruptive to everyone else.

You should come to class on time and leave class when it is dismissed. Some in-class time may be used for you to work on problem sets. Without legitimate reasons, you are not expected to leave early. Also, you should not use the in-class time to do things irrelevant to this class.

Laptops are allowed for note-taking only. Cell phones and all other electronic devices must be turned silent in class.

Food or drink is allowed to the extent that it is not disruptive to others.

For more information, refer to "The Student Code" here: https://community.uconn.edu/the-student-code-preamble/. Also, please refer to "Policy Against Discrimination, Harassment, and Related Interpersonal Violence" https://policy.uconn.edu/2015/12/29/policy-against-discrimination-harassment-and-related-interpersonal-violence/.

Students with Disabilities
Before the second week of class, please see me for academic accommodations for a documented disability.

The University of Connecticut is committed to protecting the rights of individuals with

disabilities and ensuring that the learning environment is accessible. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or http://csd.uconn.edu/. The University policy can be accessed here: https://policy.uconn.edu/2011/05/24/people-with-disabilities-policy-statement/.

Academic Integrity

I expect the highest standard of academic integrity. Cheating, plagiarism, or academic misconduct will not be tolerated. For instance, you should work on your own for the quizzes; failure to do so results in academic misconduct. For more information, please refer to the University's policy on scholarly integrity at https://policy.uconn.edu/2014/04/11/policy-on-scholarly-integrity-in-graduate-education-and-research/.

Accommodations for Illness or Extended Absences

Please stay home if you are feeling ill, and please go home if you are in class and start to feel ill. If illness prevents you from attending class, you must notify me as soon as possible. You do not need to disclose the nature of your illness; however, you will need to work with me to determine how you will complete coursework during your absence.

If life circumstances are affecting your ability to focus on courses and your UConn experience, you can email the Dean of Students at dos@uconn.edu to request support. Regional campus students should email the Student Services staff at their home campus to request support and faculty notification.

Statement on Copyright

My lectures, notes, handouts, and displays are protected by state common law and federal copyright law. They are my own original expression, and I've recorded them prior or during my lecture in order to ensure that I obtain copyright protection. Students are authorized to take notes in my class; however, this authorization extends only to making one set of notes for your own personal use and no other use. I will inform you as to whether you are authorized to record my lectures at the beginning of each semester. If you are so authorized to record my lectures, you may not copy this recording or any other material, provide copies of either to anyone else, or make a commercial use of them without prior permission from me.

Disclaimer

I reserve the right to make changes to the syllabus. All changes will be announced on the course website on HuskyCT.

Weekly Course Plan

Week/Date	Topics	Readings (Lecture notes are required; others are optional)	Assignments Due
Week 1 (8/30)	**Introduction**	1. Algebra review handout	
Week 2 (9/6)	**Descriptive statistics 1** 1. Frequency distributions 2. Basic data visualization using Excel	1. Schwabish, Jonathan A. "An economist's guide to visualizing data." *Journal of Economic Perspectives* 28, no. 1 (2014): 209-34. 2. Lecture note 3. Review of Excel basics	Letter of introduction
Week 3 (9/13)	**Descriptive statistics 2** 1. Measures of central tendency 2. Measures of dispersion	Lecture note	
Week 4 (9/20)	**Probability** 1. Probability concepts 2. Rules of probability	Lecture note	Quiz1 Quiz 2
Week 5 (9/27)	**Probability Distribution** 1. Discrete probability distributions 2. Binomial distribution	Lecture note	
Week 6 (10/4)	**Normal distribution** 1. Continuous probability distributions 2. Normal distribution	Lecture note	
Week 7 (10/11)	**Sampling** 1. Sampling basics 2. Sampling distribution	Lecture note	Quiz 3 Quiz 4 Quiz 5
Week 8 (10/18)	**Confidence intervals** 1. Inference estimation for population mean 2. Inference estimation for population proportion	Lecture note	Problem set 1
Week 9 (10/25)	**Hypothesis testing** 1. Type I and Type II errors 2. Steps of hypothesis testing	Lecture note	
Week 10 (11/1)	**Experimental Designs** 1.Concept and example	1. Holland, Paul W. "Statistics and causal inference." *Journal of the American Statistical Association* 81, no. 396 (1986): 945-960.	Quiz 6 Quiz 7 Quiz 8

	2. Difference of means tests using Excel	2. Brunner, Eric J; Robbins, Mark D.; and Simonsen, Bill. "Property Tax Information and Support for School Bond Referenda: Experimental Evidence" 2020. *Public Administration Review*. 3. NPR, Planet Money, June 9, 2023, "How randomized trials and the town of Busia, Kenya changed economics," https://www.npr.org/2023/06/09/1181448838/busia-kenya-nobel-prize-randomized-control-trials 4. Lecture note	Project STAR distributed
Week 11 (11/8)	**Research Design 1** 1. Research questions 2. Dependent and independent variables 3. Concepts and measurements	1. Johnson, Gail. 2014. *Research Methods for Public Administrators* 3rd ed. Routledge. pp, 24-31, 312. 2. Nachmias, David and Nachmias, Chava, *Research Methods in the Social Sciences*, 3rd ed, pp. 55-75. 3. Schutt, Russell K. 2019. Investigating the Social World. Los Angeles, CA: Sage. pp. 211-286. 4. Lecture note	Problem set 2
Week 12 (11/15)	**Research Design 2** 1. Theory and hypothesis development 2. Causation 3. Best practice research	1. Bretschneider, Stuart, Frederick J. Marc-Aurele, and Jiannan Wu. "Best practices" research: a methodological guide for the perplexed." *Journal of Public Administration Research and Theory* 15, no. 2 (2004): 307-323. 2. Petrovsky, Nicolai, Ge Xin, and Jinhai Yu. "Job Satisfaction and Citizen Satisfaction with Street-level Bureaucrats: Is There a Satisfaction Mirror?" *Journal of Public Administration Research and Theory* 33, no. 2 (2023): 279-295. 3. Lecture note	Quiz 9 Quiz 10
Week 13 (11/22)	**Thanksgiving Holiday**		
Week 14 (11/29)	**Open week to work on Project Star**	None	Quiz 11 Problem set 3
Week 15 (12/6)	**Group Presentation**	None	Presentation slides