PPOL 5240: Advanced Analytical Methods for Public Policy

Spring 2023
Division of Public Policy
The Hong Kong University of Science and Technology
Wednesday 10:30 to 13:20
Classroom: 1104

INSTRUCTOR: Prof. Pengyu Zhu
OFFICE: Room 4616C, Division of Public Policy
PHONE: 2358-2847
EMAIL: pengyuzhu@ust.hk
OFFICE HOURS: Thursday, 9:00-12:00 (or by appointment)

TEACHING ASSISTANT: Ning CHEN
OFFICE:
PHONE: 5989 3347
EMAIL: nchenaj@connect.ust.hk
OFFICE HOURS: By appointment
Tutorials: TBD

Course Description

This course will build on the core methodology and data analysis courses and enable students to develop the ability to use a range of different analytical methodologies for policy-related research, decision making and evaluation. The emphasis is on applications in policy problems, and a focus on dealing with complexity and uncertainty. Methods presented in the course will include popular and advanced quantitative approaches and will be taught using modeling exercises. The course also provides students with an opportunity to become proficient in the use of computer software that are widely used in analyzing quantitative data.

Course objective
The objective of this course is to introduce students to advanced analytical techniques and frameworks for use in policy-related research and decision making, with a specific focus on issues of uncertainty and complexity.

Learning Objectives

After completing this course, you will be able to:

1. Assess a range of techniques, in order to choose the best approach(es) for a particular policy analysis problem of interest.
2. Critique the analytical approaches used in existing policy analysis.
3. Demonstrate the ability to apply techniques and frameworks presented in the course to actual policy analysis problems.
4. Integrate considerations of complexity and uncertainty into analytical problems.
5. Write evidence-based policy reports/studies/papers in which quantitative analysis is used.
6. Present the findings in a way that is accessible to the public and policymakers.

TEXTBOOKS AND MATERIALS

Required Textbooks

Studenmund, A.H. (2016). Using Econometrics: A Practical Guide, 7th Edition.

Recommended Textbooks

Woodldridge, Jeffrey M. (2012). Introductory Econometrics: A modern Approach. 5th edition.

Supplementary Reading Materials

You may be asked to read a few research articles as exemplary applications of the methods covered in the course. They will be posted in the electronic format at the course website.

Statistical Software Packages

One of the objectives of the course is to help you gain proficiency using statistical software packages. You are required to use Stata to do statistical work in this course. (Although you may find it useful to learn by yourself other packages such as SAS or SPSS, all the coursework must be done using Stata.) Stata14 is installed in PCs at Computer Barn A Teaching Area. You may purchase Stata/IC using student discount at the website: https://www.stata.com/order/new/edu/gradplans/student-pricing/ (USD 45/89/198 for 6 months/Annual/Perpetual license).

For many of you who have never used Stata before, we will give a lab tutorial to help you get familiar with Stata. It is also easy to train yourself given the rich self-learning resources available. Here are some recommended resources:

- Hamilton, Lawrence C. *Statistics with STATA*. Belmont, CA: Duxbury Press.
- UCLA Stata Portal (an extensive resource that leads you to many useful links): https://stats.idre.ucla.edu/stata/modules/
- UNC Carolina Population Center : http://www.cpc.unc.edu/research/tools/data_analysis/statatutorial
- Princeton Stata Tutorial: http://data.princeton.edu/stata/
- The Stata YouTube Channel: https://www.youtube.com/user/statacorp
- The Stata website: https://www.stata.com/links/resources-for-learning-stata/

ASSESSMENT

The assessments of the course will be composed of two parts.

20% - Class participation and engagement
80% - Individual project (10% presentation, 70% final report)

Class participation and engagement (20%)

We strongly believe that student participation can substantially enrich the learning experience for both the students and the instructor. In this spirit, class participation is mandatory. You are encouraged to ask questions and to share with the class any relevant insights you may have from your work experience or from previous exposure to these topics. We will have hands-on STATA exercises every class and participation in these exercises is mandatory.

Individual project (10% presentation, 70% final report)

Participants will be required to use advanced analytical methods studied in this course to address a real-world policy issue. The project is to be conducted individually. Participants will select a policy-related problem, formulate the problem, collect suitable data, select the appropriate methodology, perform the analysis, and synthesize in a final 10-15 page report (12 font size, 1.5 line space). During the last session, students will present their project to the class and get feedbacks from instructor and classmates. Further instructions will be provided online.

Weekly Topics

Week 1: Course Introduction and Review of Linear Multiple Regression Models

Week 2: Linear Probability Mode, Probit and Logit Model

Week 3: Multinomial Logit/Probit Model and Ordered Logit/Probit Model

Week 4: Poisson Model and Tobit Model

Week 5: Structural Equations, Endogeneity and Instrumental Variable Approach

Week 6: Panel Data Model

Week 7: Difference-in-difference Model

Week 8: GIS and Spatial Analysis I

Week 9: GIS and Spatial Analysis II

Week 10: Mid Term Break, no class

Week 11: Spatial Econometrics

Week 12: Machine Learning I

Week 13: Machine Learning II

Week 14: Presentations of Individual Projects and Wrap-up

ACADEMIC DISHONESTY

The following statements and examples explain specific acts of academic dishonesty.

1. <u>Examination Behavior</u>: Any use of external assistance during an exam is considered academically dishonest unless expressly permitted.

    a. Communicating in any way with another student during the examination.

    b. Copying material from another student's exam.

    c. Using unauthorized notes, calculators or other devices.

2. <u>Fabrication</u>: Any intentional falsification or invention of data or citation in an academic exercise will be considered a violation of academic integrity.

    a. Inventing of altering data for a laboratory experiment or field project.

    b. Resubmitting returned and corrected academic work under the pretense of grader evaluation error, when, in fact, the work has been altered from its original state.

3. <u>Plagiarism</u>: Plagiarism is the theft and subsequent passing off of another's ideas or words as one's own. If the words or ideas of another are used, acknowledgement of the original source must be made through recognized referencing practice.

    a. <u>Direct Quotation</u>: Any use of a direct quotation should be acknowledged by footnote citation and by either quotation marks or appropriate indentation and spacing.

    b. <u>Paraphrase</u>: If another's ideas are borrowed in whole or in part and are merely recast in the student's own words, proper acknowledgement must, nonetheless, be made. A footnote or proper internal citation must follow the paraphrase material.

4. <u>Other Types of Academic Dishonesty</u>:

a. Submitting a paper written by another;

b. Using a paper or essay in more than one class without the instructor's express permission;

c. Obtaining an advance exam copy without the knowledge or consent of the instructor;

d. Changing academic records outside of normal procedures;

d. Using another person to complete homework assignment or take-home exam without the knowledge and consent of the instructor.

APPENDIX A: ACADEMIC DISHONESTY
SANCTION GUIDELINES

VIOLATION	RECOMMENDED SANCTION
	(assuming first offense)
Copying answers from other students on exam.	F for course.
One person allowing another to cheat from his/her exam or assignment.	F for course for both persons.
Possessing or using extra material during exam (crib sheets, notes, books, etc.)	F for course.
Continuing to write after exam has ended.	F or zero on exam.
Taking exam from room and later claiming that the instructor lost it.	F for course and recommendation for further disciplinary action (possible

	suspension).
Changing answers after exam has been returned.	F for course and recommendation for disciplinary action (possible suspension).
Fraudulent possession of exam prior administration.	F for course and recommendation for suspension.
Obtaining a copy of an exam or answer key prior to administration.	Suspension or expulsion from the university; F for course.
Having someone else take an exam for oneself.	Suspension or expulsion from the University for both students; F for course.
Plagiarism.	F for the course.
Submission of purchased term papers or papers done by others.	F for the course and recommendation for further disciplinary action. (possible suspension)
Submission of the same term papers to more than one instructor where no previous approval has been given.	F for both course.
Unauthorized collaboration on an assignment.	F for the course for both students.
Falsification of information in admission application (including supporting documentation).	evocation of university admission without opportunity to apply.

Documentary falsification (e.g., petitions and supporting materials medical documentation).	suspension or expulsion from the university; F for course when related to a specific course.
Plagiarism in a graduate thesis or dissertation.	Expulsion from the university when discovered prior to graduation; revocation of degree when discovered subsequent to graduation.

Using AI software to assist your writing will result in an 'F' grade!!!