SOSC 4330: Quantitative Data Analysis for Social Research III

Class Hours: TU & TR 10:30-11:50 a.m.

Spring 2021

Instructor: Wen WANG
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Course Description

This course provides an overview of basic microeconometric methods and applications that are widely used in quantitative social science research. Topics include linear and non-linear models, causal inference (instrumental variables, difference-in-differences, regression discontinuity), techniques for correct statistical inference, and alternative methods for causal inference. The course serves as a foundation for basic microeconomics models, emphasizing both the practical implementation of these models and the application of these models to the question of causal inference in social analysis.

The purpose of this class is twofold:

1. To introduce students to quantitative techniques that are used both to assess data before empirical work and to carry out data analysis in the completion of such work.
2. To familiarize students with modern statistical and econometric software in order to use these models and techniques (i.e., R is introduced in tutorials and used to do statistical work in lectures).

Course Prerequisites

- Students are familiar with materials covered in in **SOSC 2400** or its equivalent.
- Students have university level mathematics background and programming skills.

Course Policy

Assessments

Assessments of this course include both individual work and group work. We will split the class into **6** groups. Students can choose their group members. The size of the groups will depend on total enrollment. The groups should have a roughly equal number of students. Please go to the link to complete your group information before **Feb 17**.

For the group project, your team will collaborate to write a term paper. The paper should use what you have learned in class to do quantitative analysis for a generalizable social science topic. You will write the paper in separate parts. Before the mid-term, you should consult with the instructor and TA to choose a proper research topic (i.e., the research could be practical using available data). Then, your team will develop a literature review (i.e., assignment 2) to give a broad and up-to-date understanding of the field you choose and locate appropriate data sources to conduct data analysis (i.e., assignment 4).

- **10%** of your grade will be determined by your attendance and participation in class. You are required to do in-class programming exercises and attend tutorial hold by TA.
- **20%** of your grade will be determined by four assignments, each worth 5 points. The purpose of these assignments is to practice your programming skills and keep your team active in generating research ideas.

Assignment	Handed Out	Due Date
1. Coding Exercise (individual work)	Feb 10	Feb 28
2. Literature Review (team work)	Feb 20	Mar 7
3. Coding Exercise (individual work)	Mar 23	Apr 4
4. Data Analysis (team work)	Feb 20	Apr 18

  ∗ The literature review and data analysis should each be 2-3 pages in format of A4 size, 1-inch margins, 12-point, Times New Roman font, 1.25 spaced.
  ∗ 2 -3 pages should exclude tables, figures, charts and references.

- **30%** of your grade will be determined by a mid-term presentation (**15%**) and a referee report (**15%**). This is **individual work**. You read a paper chosen from the **second group work — the literature review** — write a **two-page** referee report and present the paper in class. Please assign your presentation dates and time using the Canvas Page coordinating with your group members. Some guidelines for the referee report:
  - **Format:** A4 size, 1-inch margins, 12-point, Times New Roman font, 1.25 spaced

  - **Structure:** 1. summarize the paper including research question, contribution, data, methods, and conclusion; 2. assessment and critique of evidence, data, and methods; 3. possible policy implications/extensions/follow-up studies.
  - **March 9 and March 11**'s lecture will be reserved for presentations of the paper you referee. **March 15** is the deadline for submitting the referee report.

- **40%** of your grade will be determined by a term paper (**20%**) and a presentation (**20%**) as a group project (**30 min** presentation + **10 min** discussion (Tentative)).

  Presentation: Classes on **April 29th, May 4th, May 6th** will be reserved for your team to present your research in class. Please assign your presentation dates and time using the Canvas Page after having a team and submit the presentation slides to TA the day before the presentation. We will take a note of your presentation to give fair grades. When one group is giving presentation, the other groups can ask questions or give comments. The comments/feedback received should be incorporated into the final draft of the term paper.

  Term Paper:

  - **Format:** up to 30 pages including reference, tables and charts; A4 size, 1-inch margins, 12-point, Times New Roman font, 1.25 spaced
  - **Structure:**
    Abstract: (1 page, 100-150 words) summary of key points for non-experts audience
    Introduction: (2-3 pages) research question, research significance, summary of research methods and results
    Literature Review: (2-3 pages) a review of previous relevant research, justification of your contribution to literature
    Data: data collection process, variable of interest, summary statistics of data
    Method: data analysis, models, and quantitative methods
    Results: regression results, research output, intuitions of the results
    Reference: see referencing guide for reference format
  - **May 17th** is the submission date of the term paper with revisions.

- **Peer Evaluation:** each team member is required to download the peer evaluation form from Canvas, fill it and send it to me by yourself after submitting the final paper before **May 20th**. **20%** of your grade from team works will be determined by the peer evaluation. **80%** will be determined by the works' quality.[1]

[1]The team works includes assignment 2 (literature review), assignment 4 (Data Analysis), term paper,

Grading Policy

- **Late submission:** late delivery of due items will **NOT** be accepted.
- **Re-grade policy:** if you want to ask for regrading, please submit your argument in writing along with your assignment. We will reassess your entire assignment using the copies we saved for regrading. The answer to "grade grubbing" is "no" and your grade may end up lower after reassessment.

E-mail Policy

I am usually quick to respond to student emails. To avoid missing your emails, I prefer you answer my email in 2 days. I will not respond to certain emails students sent including emails for missed class for which there was no presentation, emails to request an extension on an assignment for which the syllabus already established the deadline.

Academic Dishonesty Policy

HKUST is committed to high standards of academic honesty. Cheat and plagiarism are not acceptable. According to guidelines of the university, plagiarism/cheat cases typically resulted in at least the failure of a course. If you have any concern about this, include a proper citation/quotes and use web-based software(i.e., turnitin, iThenticate) to detect plagiarism.

Special Notice for Online Teaching during Pandemic

- Zoom is used for online class. Please get yourself ready for online classes by setting up Zoom. I will hold online office hours each week. Do not hesitate to go to my office hours if you have any questions. You can make appointments using my Office Hour Canvas Page (i.e., 20 min for each slot).
- Covid-19 raises stress for both students and instructors. If you have any mental or physical difficulties in taking academic responsibility, HKUST provides Special Education Needs (SEN) support, which can work out an accommodation plan for you and notify me of the eligible accommodations.

To protect personal information and team registration information, hyperlinks (i.e, highlighted in blue and red) cannot be got through in a publicly available syllabus. **Please go to Canvas to download the syllabus with hyperlinks**.

paper Presentation, which count for 50% of your grade.

Class Schedule (Tentative)

Please check the class schedule for updates as class contents are subject to change, contingent on enrollment size, mitigating circumstances and the progress we make as a class.

Week	Topic	Date	Notes	Due
1	Causality, Experimental Ideal	Feb 2	Introduction	-
		Feb 4	Story& Model	-
2	Regression, Data-Generating	Feb 9	Story& Model	-
		Feb 11	Summary& Program	-
3	Instrumental Variable	Feb 16	Story& Model	Form a Team (Feb 17)
		Feb 18	Summary& Program	-
4	Difference-in-Difference	Feb 23	Story& Model	-
		Feb 25	Summary& Program	Assignment 1 (Feb 28)
5	Regression Discontinuity	Mar 2	Story& Model	-
		Mar 4	Summary& Program	Literature Review (Mar 7)
6	Midterm Presentation	Mar 9	Presentation 1	-
		Mar 11	Presentation 2	
7	Alternative Causal Approaches	Mar 16	Story& Model	Referee Report (Mar 15)
		Mar 18	Summary& Program	-
8	Statistical Power	Mar 23	Story& Model	-
		Mar 25	Summary& Program	-
9	Hypothesis Testing	Mar 30	Story& Model	-
		Apr 1	Summary& Program	Assignment 3 (Apr 4)
10	Attrition and Bounds	Apr 6	No Class	-
		Apr 8	Summary& Program	-
11	Interpret Results	Apr 13	Story& Model	-
		Apr 15	Summary& Program	Data Analysis (Apr 18)
12	Structural Models	Apr 20	Story& Model	-
		Apr 22	Summary& Program	-
13	Review and Presentation	Apr 27	Review	-
		Apr 29	Presentation 1-3	-
14	Final Presentation	May 4	Presentation 4-6	-
		May 6	Presentation 7-9	-
		May 17		Final Paper

Textbook and Reference

Angrist, J. D. & Pischke, J.- S. (2008). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press.

Cameron, Colin & Pravin Travedi. (2005) *Microeconometrics: Methods and Applications*. Cambridge University Press.

Resources

Research Topics

- Research Topics (see in Canvas)
- Data Sources (see in Canvas)

Reading

- Reading Guide
- A Review of the Literature

Writing

- Referee Report Template
- How to Write an Effective Referee Report and Improve the Scientific Review Process
- Guidelines to Write a Referee Report
- Research Paper Template (20-page)
- Writing Tips For Economics Research Papers

Programming

- Download R
- Download RStudio
- R manuals website
- R packages website
- Basic R Tutorial