The Hong Kong University of Science and Technology

Quantitative Data Analysis for Social Research III

SOSC 4330: 3 Credits, Thursday 9:00 – 11:50 am

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Office Hours: Thursday 12:00 – 13:00 (with appointments)

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 nonlinear 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.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

ILO1. To introduce students to quantitative techniques and models for causal inference

ILO2. To introduce students to assess data and to carry out data analysis and empirical works

ILO3. To familiarize students with modern statistical and econometric software to use these models and techniques (i.e., R is introduced in tutorials and used to do statistical work in lectures).

Assessment and Grading

Group Work (50%):

- Group Final Presentation (20%)
- Final Draft Paper (20%)
- Reflection + Peer Evaluation (10%)

Reflections (5%): Students are only allowed to use Generative Artificial Intelligence to correct grammar and search for clarifications and definitions. Students need to reflect on how they use GenAI tools to assist completing group work. Students will write reflection memos on their use of generative AI in the final section of their project (i.e., final paper and referee report).

Peer Evaluation (5%): Participate in peer assessments to evaluate team members after each group project phase. This cultivates accountability and teamwork. Please download the peer evaluation form and submit it individually after submission of the final paper.

Individual Work (50%):

- Mid-term Presentation (20%)
- Referee Report (20%)
- 2 X coding assignment (10%)

Summary Table:

Assessment Task	Contribution to Overall Course grade (%)	Due date
Mid-Term Presentation	20%	TBA
Referee Report	20%	20/10/2025
Assignment 1	5%	06/10/2025
Assignment 2	5%	10/11/2025
Group Presentation	20%	27/11/2025
Final Paper	20%	15/12/2025
Reflection + Peer Evaluation	10%	15/12/2025

Mapping of Course ILOs to Assessment Tasks and Task Explanations:

Assessed Task	Mapped ILOs	Explanation
Midterm Presentation	ILO1 ILO2	Two lectures will be reserved for your presentation in class. Assign your presentation time using the Canvas Page. We will take note of your presentation to give comments and fair grades. **Evaluation**: - 5%, Clearly and independently present the work (do not read notes) - 5%, Management time (complete presentation within time) - 10%, Convey the insights of the paper well (story, method, results)
Referee Report	ILO1 ILO2	Choose **ONE paper** on the Canvas Page **"reading list"** and assign your name. The choice is exclusive. Please make your choice early. **Format: three-page** A4 size, 1-inch margins, 12-point, Times New Roman font, 1.25 spaced **Structure**: - 5%, summarize the paper (research question, data, methods, and conclusion) - 10%, assessment and critique of evidence, data, and methods - 5%, possible policy implications/extensions/follow-up studies.
Assignment	ILO3	Submit **both the word file and the R script** on time. Each file count for 2.5%.
Group Presentation	ILO1 ILO2 ILO3	One lecture will be reserved for your team to present in class. Assign your presentation time using the Canvas Page. We will take note of your presentation to give comments and fair grades. **Evaluation**: - 5%, Clearly and independently present the work (do not read notes) - 5%, Management time (complete presentation within time) - 10%, Convey the insights of the study well (story, method, results)
Final Paper	ILO1 ILO2 ILO3	**Format**: No more than 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-expert 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 https://libguides.ust.hk/basic-citation/how-to-cite GenAI memo

Grading Rubrics

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of econometric methods, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for data assessment, empirical analysis, presentation and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	Shows good knowledge and understanding of the models and causal inference, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of causal inference, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of causal inference, potential to achieve key professional skills, and the ability to make basic judgments. Has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or incompletion of core tasks (final project or individual works).

Communication and Policy

• **Late delivery of due items will NOT be accepted**! Refer to notifications for changes in classes, or tasks.

• Students are advised to consult the feasibility of their group project with TA. Feedback on group work will be provided (e.g., feasibility, strengths, areas for improvement) by the TA.

• Final Proposal Presentation comments will be released one week after submission of slides.

• Students seeking clarification or further feedback, including grading, should consult the instructor/teaching assistant within one week of receiving the grade.

Regrading Policy

If you want to ask for a reevaluation of your work, please submit your justifications in writing. We will reassess your entire work using the copies we saved for regrading. Your grade may end up lower after reassessment.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

Free-rider Policy:

Guidance to deal with the free-rider issue https://cse.hkust.edu.hk/ct/fyp/free_riders.html

If all the other team members agree not to keep collaborating with one person, please comply with the following rules to split the team: 1. Each group member needs to send an email to TA to justify their request. 2. the peer evaluation will not be split. 3. the student who leaves the group must find a new proposal & presentation topic.

Additional Resources

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.

Reading resources:

Reading Guide https://users.nber.org/~nikolovp/studentresources/reading_guide.pdf

A Review of the Literature: https://advice.writing.utoronto.ca/wp-content/uploads/sites/2/literature-review.pdf

Writing resources:

Referee Report Template

https://www.dropbox.com/s/dr89fy985veoy6b/Referee%20Report_template.pdf?dl=0

How to Write an Effective Referee Report and Improve the Scientific Review Process

https://www.dropbox.com/s/4zr59etagqzy0k2/How%20to%20Write%20an%20Effective%20Referee%20Report.pdf?dl=0

Guidelines to Write a Referee Report

https://www.dropbox.com/s/nq1n2w3quvsbg8a/Guidelines%20to%20Write%20a%20Referee%20Report.pdf?dl=0

Research Paper Template (20-page)

https://www.dropbox.com/s/hlh11xoj0yfsdch/paper_structure.pdf?dl=0

Writing Tips for Economics Research Papers

https://www.dropbox.com/s/t92uzt2i54vo9q5/writingtips.pdf?dl=0

Programming Resources:

Download R https://www.r-project.org/

Download RStudio https://rstudio.com/products/rstudio/download

R manuals website http://cran.r-project.org/manuals.html

R packages website http://cran.r-project.org/web/packages

Basic R Tutorial https://data.princeton.edu/R