

The Hong Kong University of Science and Technology

Quantitative Data Analysis for Social Research III

SOSC 4330 · 3 Credits · Thursday 3:00 – 5:50

Instructor: Wen WANG

Email: wenwangww@ust.hk

Office Hours: Posted on Canvas (by appointment)

Teaching Assistant (TA): see Canvas

Course platform: Canvas (announcements, dates, submissions)

Software: R and RStudio (free)

Course Description

This course provides an overview of basic microeconomic 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. introduce students to quantitative techniques and models for causal inference.

ILO2. assess data and carry out data analysis and empirical work.

ILO3. use modern statistical and econometric software for these models and techniques (R is introduced).

Assessment and Grading

Group-based components – 45% (depends partly on your team)

- Final (Group) Presentation — 15%
- Final Paper — 20%
- Peer Evaluation & GenAI Reflection — 10%

Individually earned components – 55% (depends only on your own work)

- Midterm (Proposal) Presentation — 15% (graded per individual presenter)
- Referee Report — 10%
- Three In-Class Content Quizzes — 10% (best 2 of 3 count, 20 min each)
- Two Coding Assignments — 10% (5% each)
- Attendance via In-Class Quizzes — 10% (best 5 of 6 check-ins, 2% each)

Generative AI (GenAI) may be used only to correct grammar and to look up clarifications or definitions. It may not be used to generate analysis, code, argument, or substantive text. A short GenAI reflection memo describing exactly how such tools were used is required inside both the final paper and the referee report. Undisclosed or disallowed GenAI use is treated as academic misconduct.

Summary of Assessment Weights and Deadlines

Assessment Task	Weight	Due (relative – exact date on Canvas)
Coding Assignment 1 (R script + write-up)	5%	End of Week 5
Coding Assignment 2 (R script + write-up)	5%	End of Week 10
Three In-Class Content Quizzes — best 2 of 3 count (20 min each)	10%	In class
Three In-Class Programming Quizzes (content not graded)	0% (attendance only)	In class during R-lab sessions
Attendance — in-class quiz and participation	10%	Throughout the term
Referee Report	10%	End of Week 6
Midterm (Proposal) Presentation	15%	In class, Weeks 7–8
Final (Group) Presentation	15%	In class, Week 13
Final Paper	20%	End of examination period
Peer Evaluation & GenAI Reflection	10%	End of examination period (with Final Paper)
Total	100%	

Assessment Tasks: ILO Mapping, Sub-Rubrics, and Rules

Assessment Task	ILOs	Requirements and Rules
Two Coding Assignments (10%; 5% each)	ILO3	Individual work. For each assignment submit BOTH files on Canvas by the deadline: – the runnable .R script, and the write-up (PDF or Word). Sub-rubric per assignment (5%): – 2.5% – code that runs top-to-bottom without error on a clean R session and reproduces the reported output; – 2.5% – correct results and a clear, correct written interpretation. Submissions that contain substantial errors, require undocumented manual corrections, or hard-code results may lose part or all of the 2.5% code component. Minor issues arising from differences in software versions, file paths, or computing environments will be assessed reasonably, provided that the submitted code clearly demonstrates a complete and good faith attempt to implement the required analysis. Identical or substantially similar code submissions across students may be treated as potential collusion and handled in accordance with the University’s Academic Integrity policy. A missing required file receives 0 for that file.
Three In-Class Content Quizzes (10%; best 2 of 3 count)	ILO1, ILO2	Three 20-minute quizzes on lecture content, given in 20 minutes of class, and submitted in person. You must be physically present and submit your own quiz in your own name. Your best two of three scores count (5% each = 10%); the lowest is dropped automatically. Because the lowest is dropped, there are no make-up content quizzes — a single missed quiz is simply the one that is dropped. The three quizzes also count toward Attendance, so each does double duty: content marks plus an attendance check.
Three In-Class Programming Quizzes + Attendance (10% total)	ILO3	Three short in-lab exercises during R sessions. Content is not graded; their purpose is low-stakes practice and verified in-person attendance. Attendance component (10%): you earn from in-class quizzes as you personally attend and submit in person and your participation. One absence is therefore forgiven automatically, with no note required. Anti-gaming: attendance cannot be earned remotely, retroactively, or by

Assessment Task	ILOs	Requirements and Rules
		proxy. Signing in, submitting, or answering on behalf of another student or having someone do so for you voids the credit for every student involved and is reported under Academic Integrity. If a documented University leave causes you to miss more than one check-in, tell the instructor early; the excused weight is moved to your remaining quizzes.
Referee Report (10%)	ILO1, ILO2	Individual work. Choose ONE paper from the Canvas reading list and register your name; choices are exclusive and first-come, so choose early. Format: three pages; A4; 1-inch margins; 12-point Times New Roman; 1.25 line spacing; over-length or mis-formatted reports are penalized. Sub-rubric (10%): – 2.5% – accurate summary (research question, data, methods, conclusion); – 5% – critical assessment of the evidence, data, and methods; – 2.5% – policy implications, extensions, or follow-up studies. A required GenAI memo must state exactly how any GenAI tool was used.
Midterm (Proposal) Presentation (15%)	ILO1, ILO2	Paper presentations are held across Weeks 7 and 8, graded individually per presenter. Presentation slots are assigned on Canvas. Sub-rubric per presenter (15%): – 4% – clear, independent delivery (no reading from notes or a script); – 4% – time management (finish within the assigned limit); – 7% – conveys the proposed study well (motivation, question, data, identification/method, results, and your thoughts).
Final (Group) Presentation (15%)	ILO1, ILO2, ILO3	Group results presentation held in Week 13. Presentation slots are assigned on Canvas. Every group member must personally present for MORE than 5 minutes; A member who presents 5 minutes or less, or who is absent from the assigned slot, receives 0 for the delivery portion regardless of the group's work. Sub-rubric (15%): – 4% – clear, independent delivery (no reading from notes or a script); – 4% – time management (finish within the assigned limit); – 7% – conveys the study well (story, method, results).
Final Paper (20%)	ILO1, ILO2, ILO3	Group research paper. No more than 30 pages including references, tables, and charts; A4; 1-inch margins; 12-point Times New Roman; 1.25 line spacing. Structure: Abstract (1 page, 100–150 words); Introduction (2–3 pages); Literature Review (2–3 pages); Data; Method; Results; References (see libguides.ust.hk/basic-citation/how-to-cite); and a required GenAI memo. Anti-gaming: work submitted after the deadline is not accepted (see Submission & Late Work). Fabricated data or results, or undisclosed reuse of another source's text or code, is academic misconduct.
Peer Evaluation & GenAI Reflection (10%)	ILO1, ILO2, ILO3	Submitted individually. Each student (a) completes a confidential peer evaluation of every team member after the project, and (b) submits a reflection memo on how GenAI tools were used. Download the peer-evaluation form from Canvas and submit it individually together with the final paper. Non-submission means giving up your right. Peer-evaluation scores feed the Free-rider Policy below and may adjust an individual's group-component grade.

Grading Rubrics

Grade	Descriptor	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 the 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 toward the learning goals. Does not meet threshold requirements or fails to complete core tasks (final project or individual work).

Course Policies

Submission and Late Work

- All work (except in-class quizzes) is submitted through Canvas and is time-tamped by Canvas. Email and hard-copy submissions are not accepted and do not count as submitted.
- Late work is NOT accepted and receives an automatic zero. Deadlines are firm.
- Local technical problems including device failure, internet, file corruption, or uploading the wrong or blank file are not valid excuses. Submit early and then verify the files you uploaded.
- The only exception is an absence or delay covered by an approved, documented University leave (for example, approved medical or official leave) reported through the proper channel before or immediately at the deadline/class. Undocumented or after-the-fact requests are not considered.
- Keep a backup and a personal copy of every submission; you may be asked to reproduce it.

In-Class Assessment Integrity

- In-class quizzes and attendance are earned only by your own in-person participation. Attending, signing, or submitting for another student or having someone do so for you is academic misconduct that voids the credit for all parties and is reported.
- Quizzes cannot be taken remotely, in advance, or after the fact.

Presentations

- Presentation order and timing are assigned on Canvas; failing to appear at your assigned slot scores zero for that presentation.

- Every group member must personally present for more than 5 minutes. A member who presents less than 3 minutes receives **half** of presentation score for the individual delivery portion, those who does not present, receives **0** for the individual delivery portion regardless of the group's overall work.
- Time limits are enforced by the instructor; presentations that run over the assigned time are penalized and may be stopped.

Regrading Policy

If you want a reassessment of your work, submit your justification in writing within one week of receiving the grade. We will reassess the entire piece of work using the copy we saved. Your grade may go down as well as up. Requests made more than one week after the grade is released are not considered.

Academic Integrity

Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance for academic misconduct. Collusion on individual work (coding assignments, referee report, and quizzes), plagiarism, fabrication of data or results, and impersonation in attendance are all violations. Please refer to "Academic Integrity | HKUST – Academic Registry" for the University's definition of plagiarism and guidance on avoiding cheating and plagiarism.

Generative AI (GenAI) Policy

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Free-rider Policy

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

If all the other team members agree not to continue collaborating with one person, the following rules apply to split the team: (1) each group member must email the TA to justify the request; (2) the peer evaluation will not be split; and (3) the student who leaves the group must find a new proposal and presentation topic.

Communication

- Refer to Canvas notifications for any changes to classes or tasks; posted information is binding.
- Students are advised to consult the feasibility of their group project with the TA, who will provide feedback (feasibility, strengths, areas for improvement).
- For any clarification or feedback, including grading, consult the instructor or TA within one week of receiving the grade.

Additional Resources

Textbook and Reference

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

Cameron, A. C. & Trivedi, P. K. (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 (see Canvas-Supplementary material)

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 Resources

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

Download RStudio: <https://posit.co/download/rstudio-desktop/>

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

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

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