ECON3334 Introduction to Econometrics

Department of Economics, HKUST | Fall 2026

AUTHOR
Jiaming Huang

PUBLISHED
September 4, 2026

Course information	Details
Instructor	Jiaming Huang
Email	jiaminghuang@ust.hk
Office	LSK7010
Office hours	**Friday, 10:30-11:30**
Prerequisite	One of ISOM 2500, MATH 2411, or MATH 3423, or consent of the instructor

Course Description

This is an introductory course to econometrics. Econometrics is a quantitative approach to economics that integrates statistics, economic theory, and mathematics. We focus on three aspects of econometrics: describing patterns of data, estimating causal effects, and forecasting.

We begin with applications and **introduce probability, statistics, and mathematics when they are needed**. The main topics are randomized controlled trials, A/B testing, linear regression, instrumental variables, forecasting, and if time permits, introductory machine learning. Students will learn not only how to apply a method, but also how to explain what can and cannot be learned from the result.

Prerequisites

Probability and statistics, at the level of Chapter 2-3 of Stock and Watson (2019)

Learning Outcomes

By the end of the course, a successful student should be able to:

1. Translate an economic or business question into a descriptive, predictive, or causal empirical question.
2. Explain the roles of the population, sample, estimand, estimate, and uncertainty.
3. Estimate and interpret simple and multiple linear regressions, confidence intervals, and hypothesis tests.
4. Evaluate randomized experiments and A/B tests, including threats to validity.
5. Distinguish predictive performance from causal identification and evaluate models using out-of-sample evidence.
6. Explain confounding, omitted-variable bias, and the relevance and exclusion conditions for an instrumental variable.
7. Conduct a reproducible empirical analysis and communicate its findings and limitations clearly.

These outcomes support the School learning goals on analytical problem solving, information technology, disciplinary knowledge, communication, collaboration, and ethical responsibility.

Teaching, Learning, and Course Materials

Lectures:

- L2: Monday 4:30PM-5:50PM and Friday 12:00PM-1:20PM, LSK1007.
- L3: Monday 1:30PM-2:50PM and Friday 9:00AM-10:20AM, LSK1009.

Tutorials will review background materials such as probability and statistics, assessed quizzes on selected dates, and project preparation. **They are not held every week; dates will be announced on Canvas.**

- L2 TA: Yekaterina SMOLYAKOVA (ysmolyakova@connect.ust.hk).
- L3 TA: Chris CHEUNG (chrischeung@ust.hk).

Course materials are

- the lecture slides
- course repository (in Python)
- project instructions posted through Canvas.

There is no required textbook. Useful references are Stock and Watson (2019), James et al. (2021), and Angrist and Pischke (2015).

Assessment

Assessment	Weight	Design
Final exam	40%	Cumulative, written exam
Quizzes	30%	Three quizzes; the best two count
Empirical project	20%	Common replication template applied to different RCT or A/B papers
Project discussion	10%	In-class discussion of the empirical project

Final Exam (40%)

The exact format and permitted reference materials will be coordinated across sessions and announced on Canvas.

Quizzes (30%)

- There will be **three quizzes held in tutorials**
- The **best two** scores count, each worth 15 points
- The course repository will include AI skills that generate module-based practice questions and provide provisional feedback or guided hints. Students can request a comprehensive concept check or a more

applied exercise, attempt it independently, and then inspect the feedback. These activities are ungraded, and generated questions, solutions, or scores may contain errors; the course materials and teaching team remain authoritative.

Empirical Project (20%)

May be adjusted in response to class progress

Students may complete the empirical project in a group of 3-4. Students choose from a curated set of empirical papers based on randomized controlled trials or A/B tests. The papers study different questions and settings, but every project follows the same structure and uses only methods covered by Week 7. The instructor may limit the number of groups assigned to the same paper.

Each project package provides the selected paper, cleaned data, a data dictionary, starter code, and a target result. Students complete the same core tasks:

1. describe the experimental design, outcomes, and treatment assignment;
2. reproduce one main treatment-effect table or figure;
3. estimate and interpret a regression-adjusted treatment effect; and
4. complete one predefined heterogeneity or robustness check.

The final submission consists of a reproducible analysis and a concise memo explaining the findings, uncertainty, assumptions, and limitations.

Discussion (10%)

Based on in-class discussion of the empirical projects.

Academic Integrity and Honesty

- Instructions and deadlines will be posted on Canvas.
- Marks and feedback will normally be released within two weeks.
- Regrading requests must identify a specific possible error and be made within five working days of receiving feedback.
- Documented illness or other circumstances beyond a student's control are handled under University procedures.

Please make sure to adhere to the university policy on academic integrity; see here.

Use of Generative Tools

Generative tools may be used for optional practice and for the empirical project when their use is disclosed and the output is independently checked. Students remain responsible for all submitted code, evidence, citations, and conclusions. These tools are not permitted in assessed quizzes or the final exam. Do not upload confidential, personally identifiable, copyrighted, or otherwise restricted data to an external service.

Tentative Schedule

The schedule may be adjusted in response to class progress. Detailed readings, exercises, and deadlines will be posted on Canvas.

Week	Tentative topics
1	Introduction to econometrics and empirical questions
2	Randomized controlled trials: design, data, and comparison
3	Randomized controlled trials: treatment effects and statistical inference
4	A/B testing and experimental applications
5	Simple linear regression
6	Multiple linear regression
7	Regression inference and diagnostics
8	Causal regression and common threats to validity
9	Instrumental variables: motivation and identification
10	Instrumental variables: estimation and applications
11	Forecasting and time-series data
12	Introductory machine learning, if time permits
13	Project presentations and course review

References

Angrist, Joshua David, and Jörn-Steffen Pischke. 2015. *Mastering 'Metrics: The Path from Cause to Effect*. Princeton ; Oxford: Princeton University Press.

James, Gareth, Daniela Witten, Trevor Hastie, and Robert Tibshirani. 2021. *An Introduction to Statistical Learning: With Applications in r*. Second edition. New York NY: Springer.

Stock, James H., and Mark W. Watson. 2019. *Introduction to Econometrics*. Fourth edition. New York, NY: Pearson.