

The Hong Kong University of Science and Technology

Syllabus

Introduction to Econometrics

Department of Economics

ECON3334

4 credits

One of ISOM 2500, MATH 2411 or MATH 3423

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Office Hours: LSK6070, Fri 11-12am

Venue:

L1 Wed, Fri, 13:30-14:50, LSK1005

L2 Wed, Fri, 16:30-17:50, LSK1007

Course Description

This course introduces students to basic econometric techniques and their applications in empirical economic analysis. It begins with a review of probability and mathematical statistics and focuses on linear regression models with one regressor and multiple regressors. The basic theory of estimation and inference is introduced, with an emphasis on practical issues in the econometric analysis of cross-sectional data. The key concepts of causal inference are highlighted.

Intended Learning Outcomes (ILOs)

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

1. Identify weaknesses in their econometric knowledge and fill the gaps.
2. Understand basic probability and statistical theories.
3. Understand causal models and their relationship to regression models.
4. Understand the theory of estimation and inference for regression models.
5. Read cases using econometric techniques and interpret the results.
6. Apply econometric techniques to real cases and explain the implications.

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

In-class questions 20%: Students will be awarded 1 point per question asked during class, with a maximum of 2 point per class. To receive credit, students must record the date, class name, question, and question number in the appropriate Discord channel by the next class. This will help ensure accurate tracking of participation and credit for each student.

Problem Sets 20%: There will be problem sets for each module (1-10). Each problem set accounts for 2%. The problems are taken from past exams and can be used to prepare for exams. Late submission of problem sets, for whatever reason, will not be accepted.

Midterm exam 30%: Closed-book exam. The date time and venue will be discussed in the class.

Final Exam 30%: Closed-book exam. The final will be cumulative, covering all the course materials including those covered by the midterm.

You will need a very strong reason, substantiated by supporting documents, to miss any exam. Considering the advantage of having more time to prepare, the make-up exam, if permitted, is expected to be more difficult than the original exam.

Assessment Task	Contribution to Overall Course grade (%)	Due date
In-class discussions	20%	Every class
Problem sets	20%	1 week since assignment
Midterm exam	30%	Mid-October
Final exam	30%	Exam week in December

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
In-class discussions	ILO 1	This task assesses students' ability to identify their weakness in their econometric knowledge and articulate questions to clarify the problems (ILO 1)
Problem sets	ILO 2-4	This task assesses students' understanding of the basic concepts and theories in probability, statistics, and econometrics (ILO 2-4)
Midterm Exam	ILO2-5	This task assesses students' understanding of the basic concepts and theories in probability, statistics, and econometrics (ILO 2-4) and their ability to apply the theories to real

		cases to interpret the result (ILO5) and explain the implications (ILO 6)
Final Exam	ILO2-5	This task assesses students' understanding of the basic concepts and theories in probability, statistics, and econometrics (ILO 2-4) and their ability to apply the theories to real cases to interpret the result (ILO5) and explain the implications (ILO 6)

Grading Rubrics

In-class discussion rubric

Criteria	Good	Fail	Mapping to Course ILOs
Initiative	Do not hesitate to ask questions in the classroom whenever you have trouble following the class materials.	Hesitate to ask questions in the classroom whenever you have trouble following the class materials.	ILO 1
Clarity	Ask a question that makes sense and is stated clearly	Ask a question that is hard to understand	ILO 1

Problem sets rubric

Criteria	Good	Fail	Mapping to Course ILOs
Correctness	The answer is correct	The answer is not correct	ILO 2-4
Clarity	The logic leading to the answer is clearly explained	The logic leading to the answer is not clearly explained	ILO 2-4
Readability	The answer sheets are written and organized in a way that makes them easy for the grader to read.	The answer sheets are not written and organized in a way that makes them easy for the grader to read.	ILO 2-4

Midterm/Final exam rubric

Criteria	Good	Fail	Mapping to Course ILOs
Correctness	The answer is correct	The answer is not correct	ILO 2-5
Clarity	The logic leading to the answer is clearly explained	The logic leading to the answer is not clearly explained	ILO 2-5
Readability	The answer sheets are written and organized in a way that makes them	The answer sheets are not written and organized in a way that	ILO 2-5

	easy for the grader to read.	makes them easy for the grader to read.	
Application	The assumptions and limitations of econometric techniques are clearly presented in the arguments.	The assumptions and limitations of econometric techniques are not clearly presented in the arguments.	ILO 2-5

Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals. Score >= 85.
B	Good Performance	Shows good knowledge and understanding of the main subject matter, 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. Score >= 70.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals. Score >= 50.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline. Score >= 40.
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 development in the discipline. Score < 40.

Course AI Policy

The use of Generative AI is permitted to assist students with brainstorming, drafting, and writing their papers except for the closed-book exams.

Communication and Feedback

All communication should be made through a Discord server specified in the canvas page and in the orientation class. Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on problem sets include discussion in the classroom. Students who have further questions about the feedback, including marks, should consult the instructor within five working days after the feedback is received.

Resubmission Policy

Late submission of problem sets, for whatever reason, will not be accepted.

Recommended Texts and Materials

Stock, James and Mark Watson. Introduction to Econometrics (4th edition), Pearson.

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 for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

Course schedule

Orientation

Module 0: Introduction econometrics

Module 1: Review of probability

Module 2: Review of statistics

Module 3: Linear regression with a single regressor: Estimation

Module 4: Linear regression with a single regressor: Characterization

Module 5: Linear regression with a single regressor: Inference

Module 6: Linear regression with multiple regressors: Estimation

Module 7: Linear regression with multiple regressors: Inference

Applications of linear regression

Module 8: Instrumental variable regression with a single regressor: Binary instrument

Module 9: Instrumental variable regression with a single regressor and a single instrument

Module 10: Instrumental variable regression with multiple regressors and multiple instruments

Applications of instrumental variable regression