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 10%: Students will be awarded 2 points per question asked during class, with a maximum of 2 points (1 question) 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 30%: There will be problem sets for each module (1-10). Each problem set accounts for 3%. 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	10%	Every class
Problem sets	30%	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	Hesitate to ask	ILO 1
	questions in the	questions in the	
	classroom whenever	classroom whenever	
	you have trouble	you have trouble	
	following the class	following the class	
	materials.	materials.	
Clarity	Ask a question that	Ask a question that is	ILO 1
	makes sense and is	hard to understand	
	stated clearly		

Problem sets rubric

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

Midterm/Final exam rubric

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

	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.
	Good Performance	Shows good knowledge and understanding of the main subject
в		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.
		Possesses adequate knowledge of core subject matter,
C	Satisfactory Performance	competence in dealing with familiar problems, and some capacity
C	Satisfactory refrontinance	for analysis and critical thinking. Shows persistence and effort to
		achieve broadly defined learning goals. Score >= 50.
	Marginal Pass	Has threshold knowledge of core subject matter, potential to
D		achieve key professional skills, and the ability to make basic
5		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