Applied Econometrics I
1st Module, 2025-2026

Course Information

Instructor: Liang Chen
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Office Hour: Monday to Friday 9:00 -10:00

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Classes:
Lectures: Tue & Fri 15:30-17:20
Venue: PHBS Building, Room XXX

1. Course Description

1.1 Context

Course overview: The course objective is to learn econometric methodologies that are widely used in empirical research papers. Students will learn theory and interpretation from analysis of economic data. This course will help students use and understand regression, asymptotic analysis and intuition behind widely used econometric models.

Prerequisites: Mathematics (GEN500) or Business Mathematics (ECON500)

1.2 Textbooks and Reading Materials

There are no required textbooks in this course. Students are expected to have completed undergraduate econometrics. The textbooks that are used as main reference for lectures are as follows.

Hayashi, F. (2000). *Econometrics*, Princeton University Press.

Wooldridge, J.M. (2010). *Econometric Analysis of Cross Section and Panel Data*, MIT press.

Other recommended textbooks are as follows.

Stock, J.H., Watson, M.W. (3rd edition). *Introduction to Econometrics*, Person Education.

Green, W. (2008). *Econometric Analysis*, Prentice Hall.

2. Learning Outcomes

2.1 Intended Learning Outcomes

Learning Goals	Objectives	Assessment (YES with details or NO)
1. Our graduates will be effective communicators.	1.1. Our students will produce quality business and research-oriented documents.	No.
	1.2. Students are able to professionally present their ideas and also logically explain and defend their argument.	No.
2. Our graduates will be skilled in team work and leadership.	2.1. Students will be able to lead and participate in group for projects, discussion, and presentation.	No.
	2.2. Students will be able to apply leadership theories and related skills.	No.
3. Our graduates will be trained in ethics.	3.1. In a case setting, students will use appropriate techniques to analyze business problems and identify the ethical aspects, provide a solution and defend it.	No.
	3.2. Our students will practice ethics in the duration of the program.	No.
4. Our graduates will have a global perspective.	4.1. Students will have an international exposure.	Yes, the course is taught in English full-time.
5. Our graduates will be skilled in problem-solving and critical thinking.	5.1. Our students will have a good understanding of fundamental theories in their fields.	Yes, students will learn fundamental theories in Econometrics.
	5.2. Our students will be prepared to face problems in various business settings and find solutions.	Yes, by understanding methodologies used in economic research.
	5.3. Our students will demonstrate competency in critical thinking.	Yes.

2.2 Course specific objectives

2.3 Assessment/Grading Details

Attendence: 10%
Midterm exam: 30%
Final exam: 60%

I will periodically assign problem sets throughout the course. Although they will not be collected or graded, it is very important to do them, as they are the best way to learn and prepare for the exams.

There will be no make-up exam, *no exceptions*. If you miss an exam due to medical reasons, and a doctor's certificate is provided, your grade will be determined by the other exam you have taken. For example, if you miss the final exam, your final exam score will be counted as 70% of your midterm exam score.

Both midterm and final exams are closed-book, you cannot bring anything except for stationery items (such as pencils and pens). Any student found responsible for violating academic honesty (see 2.4) will earn a failing grade for the course.

2.4 Academic Honesty and Plagiarism

It is important for a student's effort and credit to be recognized through class assessment. Credits earned for a student work due to efforts done by others are clearly unfair. Deliberate dishonesty is considered academic misconducts, which include plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis.

All assessments are subject to academic misconduct check. Misconduct check may include reproducing the assessment, providing a copy to another member of faculty, and/or communicate a copy of this assignment to the PHBS Discipline Committee. A suspected plagiarized document/assignment submitted to a plagiarism checking service may be kept in its database for future reference purpose.

Where violation is suspected, penalties will be implemented. The penalties for academic misconduct may include: deduction of honour points, a mark of zero on the assessment, a fail grade for the whole course, and reference of the matter to the Peking University Registrar.

AI tools requirements：
Using AI tools to complete assignments or assessments without the approval of the course instructor will be regarded as an act of academic dishonesty. Depending on the severity of the situation, penalties will be implemented in accordance with the provisions of the Peking University Graduate Student Handbook.

For more information of plagiarism, please refer to *PHBS Student Handbook*.

3. Topics, Teaching and Assessment Schedule

Week 1: Review of mathematics and basic econometrics
1: Linear Algebra, probability, statistics
2: Models, parameters, estimation, consistency, asymptotic normality

Week 2: OLS regression
1: Formular of OLS, properties of OLS
2: Random control trials and applications

Week 3: Instrumental variable (IV) method
1: Endogeneity in econometrics, IV estimation, 2-step least sequres estimation
2: Applications of IV estimation

Week 4: Panel Data Models
1: Panel data models, fixed effects estimation
2: Applications of panel data models

Week 5: Review and Midterm Exam
1: Review
2: Midterm Exam

Week 6: Models for limited dependent variables
1: Maximum likelihood estimator, probit and logit models
2: Applications

Week 7: Estimation of treatment effects I
1: Propensity score matching
2: regression discountinuity design and applications

Week 8: Estimation of treatment effects II
1: Difference-in-difference
2: Applications

Week 9: Final review

Depending on our pace throughout the module, topics may be added or omitted. Not all topics will be covered in the same detail.