

**THE UNIVERSITY OF HONG KONG**  
**HKU Business School**

**ECON6005 Econometric Theory I**

<b>GENERAL INFORMATION</b>	
Instructor: Ping Yu Email: pingyu@hku.edu.hk Office: KKL1108 Phone: 2857-8358 Consultation time: 2:30pm-3:30pm, Friday  Teaching time: 9:30am-12:20pm, Sunday Teaching location: MWT7/Virtual by Zoom	
<b>COURSE DESCRIPTION</b>	
This course is designed for first-year Economics Ph.D. students, and can be used, as one of the core courses, to satisfy the graduation requirements of the MEcon Programme. Students are expected to be proficient in calculus, matrix algebra, and econometrics at the undergraduate level (i.e., ECON2280). The basic methods of modern econometrics, e.g., least squares estimation, maximum likelihood method and generalized method of moments, are covered. Linear models, e.g., linear regression and linear endogenous models are emphasized, but nonlinear models, e.g., nonlinear regression and nonlinear endogenous models, will also be discussed.	
<b>COURSE OBJECTIVES</b>	
<ol style="list-style-type: none"> <li>1. To help applied economic researchers to understand the most popular econometric techniques used in applied journals such as AER, JPE and QJE.</li> <li>2. To help theoretical econometricians to lay a technical foundation for future studies.</li> </ol>	
<b>COURSE LEARNING OUTCOMES</b>	
<b>Course Learning Outcomes</b>	<b>Aligned Programme Learning Outcomes</b>
By the end of this course, students should be able to:	
CLO1: Interpret the least squares estimator and associated estimators as projections. CLO2: State and prove the basic finite-sample properties of estimators (e.g. unbiasedness and Gauss-Markov theorem) and the conditions under which they apply. CLO3: Derive the basic large-sample properties of the least squares estimator (e.g., consistency, asymptotic normality, and consistency of the covariance matrix estimators) using a set of appropriate conditions CLO4: Perform t-test, Wald test and construct confidence intervals. CLO5: Understand p-value, test consistency and the asymptotic local power. CLO6: Know specification testing, model selection, estimation and testing with heterogeneity, and forecast intervals. CLO7: Understand the parallel results in the GMM framework when there is endogeneity.	<ul style="list-style-type: none"> <li>- Understanding of fundamental theories and new development in economics (CLO 1-7)</li> <li>- Mastering of skills in analyzing economic data (CLO 4-7)</li> <li>- Demonstration of ability to apply economic knowledge and analytical skills to address policy and business problems (CLO 6-7)</li> <li>- Awareness of ethical concerns in economic issues (CLO 6-7)</li> <li>- Mastering of communication skills (CLO 1-7)</li> </ul>

<b>COURSE TEACHING AND LEARNING ACTIVITIES</b>			
<b>Course Teaching and Learning Activities</b>		<b>Expected contact hour</b>	<b>Study Load (% of study)</b>
T&L1. Lecture. Instructor will give lectures on major concepts and issues. (CLO 1-7)		36	30%
T&L2. Consultation. Instructor holds weekly consultation hours to answer students' questions. (CLO 1-7)		12	10%
T&L3. Self study. Solve the analytical exercises in the lecture notes. (CLO 1-7)		36	30%
T&L4. Computer programming. Solve the empirical exercises in the lecture notes. (CLO 1-7)		24	20%
T&L5. Tutorial sessions. (CLO 1-7)		12	10%
Total		120	100%
<b>ASSESSMENT METHODS</b>			
<b>Assessment Methods</b>	<b>Brief Description (Optional)</b>	<b>Weight</b>	<b>Aligned Course Learning Outcomes</b>
A1. Problem Sets		10%	CLO1-7
A2. Midterm Test		40%	CLO1-7
A2. Final Exam		50%	CLO1-7
Total		100%	
<b>STANDARDS FOR ASSESSMENT</b>			
<b>Grade</b>	<b>Course Grade Descriptor</b>		
A+, A, A-	Strong evidence of superb ability to fulfill the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate and synthesis.		
B+, B, B-	Strong evidence of ability to fulfill the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate and synthesis.		
C+, C, C-	Evidence of adequate ability to fulfill the intended learning outcomes of the course at low levels of learning; such as describe and apply, but not at high levels of learning such as evaluate and synthesis.		
D+, D	Evidence of basic familiarity with the subject.		
F	Little evidence of basic familiarity with the subject.		
<b>Assessment Rubrics for Each Assessment</b>			
Problems sets include all empirical exercises in the lecture notes. The midterm and final will mimic the exercises in the lecture notes; please refer to previous exams for concrete examples.			
<b>Means/Processes for Student Feedback on Course</b>			
The students can provide their feedbacks through the SETL questionnaire or emailing the instructor directly.			
<b>Course Policy</b>			
Policy on plagiarism: If judged as "plagiarism", you are in serious trouble. If a few students are judged to copy each other, each gets zero mark. The instructor will not judge who copied whom.			

In Class if f2f: (i) turn off your cell phone and keep quiet; (ii) come to class and return from the break on time; (iii) you can ask me freely in class, but if your question is far out of the course or will take a long time to answer, I will answer you after class.

In Class if Virtual by Zoom: (i) mute yourself during the class (the instructor will mute all at the beginning of the class, but you can unmute yourself if you really want to speak); (ii) come to class and return from the break on time; (iii) for teaching efficiency, please do not ask the instructor questions during the class; type in your questions through the chat function of Zoom during the class OR mark down your questions and ask the instructor during the fifteen minutes break.

#### **COURSE CONTENT AND TENTATIVE TEACHING SCHEDULE**

**Week 1: Introduction (LN1)**

**Week 2: Projection (LN2)**

**Week 3: Projection (continued)**

**Week 4: Least Squares Estimation-Finite Sample Properties (LN3)**

**Week 5: An Introduction to Asymptotic Theory (LN4)**

**Week 6: Least Squares Estimation-Large Sample Properties (LN5)**

**Week 7: MIDTERM EXAMINATION (in class)**

**Week 8: Least Squares Estimation-Large Sample Properties (continued)**

**Week 9: Additional Topics on Linear Regression (LN6)**

**Week 10: Endogeneity and Instrumental Variables (LN7)**

**Week 11: Endogeneity and Instrumental Variables (continued)**

**Week 12: Single-Equation GMM (LN8)**