

**The Chinese University of Hong Kong, Fall 2020**  
**ECON5121A: Econometric Theory and Applications**

**Instructor:**

Shi, Zhentao

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**Teaching Assistant:**

Chen, Junlin

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**Lecture Hours:**

Friday 8:30—11:15 am, Zoom link <https://cuhk.zoom.us/j/9168284819>

Dates: September 11, 18, 25;

October 9, 16, 23, 30;

November 6, 13, 20, 27;

Dec 4

**Teaching Mode:**

Teaching will be conducted online until University's further notice. If taught face-to-face, all classes will be live streamed and students are free to choose attending classes in person or online.

**Prerequisites:**

- Undergraduate level *multivariate calculus* (two semesters), *linear algebra* (one semester), and *probability and statistics* (one semester). Students who do not meet the prerequisites must seek the instructor's approval in advance.
- Undergraduate *econometrics* is a plus, though not necessary.

**Topics:**

This is an entry-level Ph.D. econometrics course. Under the asymptotic framework, it covers estimation and inference of the regression models and the instrumental variable models. It focuses on theory --- applying statistical theory to econometric models. It is NOT about how to apply econometric methods to empirical data.

- (Week 1, 2) Conditional expectation and linear projection
- (Week 3) Least squares estimator I: linear algebra
- (Week 4) Least squares estimator II: likelihood and exact distribution
- (Week 5) Basic asymptotic theory I: limits and modes of convergence
- (Week 6) Basic asymptotic theory II: applications
- (Week 7) Hypothesis testing I: concept
- (Week 8) Hypothesis testing II: applications
- (Week 9) Panel data models
- (Week 10, 11) Endogeneity and instruments
- (Week 12) Generalized method of moments

**Textbooks:**

- Hansen (2020): Introduction to Econometrics (<https://www.ssc.wisc.edu/~bhansen/probability/>) *Downloadable for free*
- Hansen (2020): Econometrics (<http://www.ssc.wisc.edu/~bhansen/econometrics/>) *Downloadable for free*

**Lecture Notes:**

- <https://github.com/zhentaoshi/Econ5121A> (Updates will be made as the course progresses)

**Assessment:**

- Attendance (15%): turn on webcam in class
- Assignment (35%): hand in one week after assignment
- Final (50%): open-book, but no electric devices are allowed

**Academic Honesty:**

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at <http://www.cuhk.edu.hk/policy/academichonesty/>.