

**ECON 703300**  
**Topics in econometrics**  
**National Tsing Hua University**  
**2<sup>nd</sup> semester, 2023-2024**

**Time:** 13:20pm -16:20pm, every Monday (M5M6M7) except February 26.  
Make-up class may be arranged.

**Venue:** TSMC 832

**Office hours:** By appointment

**Instructor:** CY (Chor-yiu) SIN

(Office: CTM-804, Email: [cysinhkbu@gmail.com](mailto:cysinhkbu@gmail.com), [cysin@mx.nthu.edu.tw](mailto:cysin@mx.nthu.edu.tw))

**Examination schedule:**

Mid-term oral presentation: TBD

Final oral presentation: TBD

**Course description:** This is a reasonably updated course of Graduate Econometrics. More precisely, (i) Large-sample properties are the emphases; (ii) Monte-Carlo experiment will be introduced, as it is a way to assess the finite-sample properties; (iii) Relationships between the large-sample properties and the prevalent empirical tools such as those in Causal Inference or Machine Learning will also be discussed.

**Course topics:**

1. The difficulties of deriving finite-sample properties
2. Large-sample properties: linear models and LS (least squares)/IVE (instrumental variable estimation)
3. Large-sample properties: non-linear models and MLE (maximum likelihood estimation)
4. Mis-specification analysis and robust standard errors
5. Monte-Carlo experiments
6. Large-sample properties and casual inference
7. Large-sample properties and machine learning (and/or non-parametrics)

**Major textbook:**

Hansen, B.E, 2022. Econometrics. NJ, U.S.A.: Princeton University Press.

**Other textbooks:**

- (1) Hayashi, F., 2000. Econometrics. NJ, U.S.A.: Princeton University Press.
- (2) Kuan, C.-M., 2000. Introduction to Econometric Theory. Manuscript.
- (3) White, H., 1984. Asymptotic Theory for Econometricians. CA, U.S.A.: Academic Press.
- (4) White, H., 2001. Asymptotic Theory for Econometricians, Revised Edition. CA, U.S.A., Academic Press.
- (5) Wooldridge, J.M., 2020. Introductory Econometrics: A Modern Approach, Seventh Edition. MA, U.S.A.: Cengage.

**Assessment:** Attendance and participation in discussions 40%, mid-term examination (oral presentation) 30%, final examination (oral presentation and **individual** written report) 30%.

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