ECON 6190: Econometrics I
Fall 2024

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Office Hours: 9:00 am - 10:00 am Tuesdays and Thursdays, or by appointment
Class Time & Location: 10:10 ams-11:25 am, Tuesdays and Thursdays, Rockefeller Hall 122
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Course Description

Econ 6190 introduces fundamental econometric methods to first year PhD students in Economics. The course contains three parts:

Part I: Introduction to statistical inference
Covers fundamental concepts in statistical inference and prepare you for Part II and III.

Part II: Large-sample approach to statistical inference
Introduces some important large-sample tools frequently used in economic and econometric research. The materials are self-contained.

Part III: Classical theory of estimation and inference
Includes the fundamentals of maximum likelihood estimation, method of moment, hypothesis testing, and confidence intervals.

Course Materials

No single textbook covers all the topics we discuss. Weekly class slides are provided and largely follow the following textbook:

• *Probability and Statistics for Economists,* Bruce Hansen*,* downloadable at https://www.ssc.wisc.edu/~bhansen/probability/

The following references might be helpful:

• *Probability Theory and Statistics for Economists,* Yongmiao Hong, viewable via Cornell library: https://newcatalog.library.cornell.edu/catalog/13084256.

• *Statistical Inference*, George Casella and Roger L. Berger, 2nd ed. Australia: Duxbury/Thomson Learning, 2002. [**Highly Recommend**!]

Assessment

Your grade for the course is based on the following four components:

• **Problem sets (10%)**
There are ten problem sets in total, sorted in topics. Homework is assigned approximately weekly and will be collected and graded. Each homework will be graded as follows:

1 point (full mark): submitted in time and no substantial methodological errors or major conceptual misunderstandings of the materials
0.6 point: submitted in time but there are substantial methodological errors or major conceptual misunderstandings of the materials
0 point: no submission or submitted but no attempt

You have one quota for one late submission of no later than 24 hours in the semester.

- **Mid term exam (20%)**: in class on Thursday October 3. Closed-book and closed-note.
- **Second exam (20%)**: 7:30-9:00 pm, Tuesday, November 5, location TBD. Closed-book and closed-note.
- **Final exam (50%)**: in the finals week. Closed-book and closed-note.

Note: exam dates are set centrally and no make-up exam of any kind is possible. Please make sure you are available for the exams.

Course Outline

Topic 1: Introduction to statistical inference [Hansen Ch. 5, 6, Casella and Berger, Ch. 6]
- Population and Sampling Model
- Some Common Statistics
- Sampling from Normal Distribution
- Sufficient Statistics
- Examples of Estimators and Measures of Their Quality

Topic 2: Asymptotic Theory [Hansen Ch. 7, 8]
- Convergence in Probability
- Proving Convergence in Probability
- Almost Sure Convergence
- Stochastic Orders of Magnitude
- Convergence in Distribution
- Delta Method

Topic 3: Estimation [Hansen Ch. 9,10]
- Maximum Likelihood Estimation
- Method of Moments

Topic 4: Hypothesis Testing [Hansen Ch. 13]
- Basic Concepts
- Classical Approach
- Power Analysis
- Likelihood Ratio Test

Topic 5: Confidence Interval [Hansen Ch. 14]
- Finding Confidence Interval by Pivotal Quantities
- Finding Confidence Interval by Test Inversion
- Evaluation of Confidence Interval

Course Accommodations

Students with Disabilities: Your access in this course is very important to me. In order to have adequate time to arrange your approved accommodation(s), you must request your SDS accommodation letter no later than the add/drop deadline for the semester.
- **Students currently registered with SDS**: Once you request your accommodation letter and it is approved by SDS, it will be emailed to both you and me. Processing time can be up to 48-hours.
- **Students not registered with SDS**: The registration process for new accommodations can take up to three weeks. Once you are approved by SDS for accommodations, you will be able to request your accommodation letter for this course.
- **If you are approved for accommodations later in the semester**: you must request your accommodation letter as soon as possible.

Students with Exam Accommodations: In addition to requesting your accommodation letters, this course will be participating in the **Alternative Testing Program (ATP)**. All exams will be centrally managed and supported by the ATP Testing Coordinator in the Office of Student Disability Services and accessible in your SDS student portal. **ATP support includes**:
- **Scheduling of accommodated exams:**
  - *Daytime exams*: Students are expected to start their accommodated exam at the same time as the general exam administered during class time.
    - Students with extended time accommodations who have an academic conflict (i.e. a course immediately following this class) may select to take their accommodated exam at 8 a.m on the same day as the general exam. More information is available here at sds.cornell.edu/atp
  - *Evening prelims*: Evening prelim exams will begin promptly at 6:30 p.m.
- **Notification of accommodated exam logistics**:
  - All exam logistics are managed by the ATP and will ONLY be communicated to you via email from sds-testing@cornell.edu and accessible in your SDS student portal. Please do not contact me with questions about exam logistics, as I will not be able to answer them.
  - *10-days prior to the exam date*: ATP will automatically send an email with the exam date, time, location.
  - *48-hours prior to the exam date*: ATP will send a reminder email about the exam.

- For students with other academic accommodations (not testing-related), please follow up with me to discuss the necessary logistics of your accommodation(s).

Academic Integrity

- This course follows CORNELL CODE of ACADEMIC INTEGRITY and Cornell's Code of Campus Conduct. Violations will be taken seriously. Students tend to be most tempted to violate these codes when they are concerned about their course grade. If you are concerned to that degree, please talk to me, the TA, or an academic advisor.

- Please note that videotaping, photographing, audio taping, or otherwise making any picture or sound recording of the professor or of a TA is **NOT** permitted without written consent of the professor. Failure to comply with this rule is a violation of Cornell's Campus Code of Conduct. Moreover, students are not authorized to replicate, reproduce, copy or transmit such materials, or "derivative" materials, including class notes, for sale or general distribution to others without the written consent of the faculty or academic staff member or class participant who is the original source of such materials; and that violations of the above constitute academic misconduct as described in the Code of Academic Integrity.

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