Econ 9472: Econometric Theory I

Fall 2024

Instructor	Zack (J. Isaac) Miller	millerjisaac@missouri.edu
Course	MW 2:00-3:15PM	Locust Street Building E204A
Office Hours	W 10:00-11:00AM	Locust Street Building E220
Website	Canvas (https://umsystem.instructure.com/)	

Welcome to Mizzou and to the first semester of our Economics PhD program!

Course Objectives: The primary objective is to introduce the student to econometric analysis of data at an advanced level. The emphasis of the course is on theoretical analysis of cross-sectional methods, particularly least squares. Although all econometric tools are designed with an eye toward empirical application, a solid theoretical understanding of these tools is critical to sound application of them. These tools are applied in nearly all fields of research in economics and econometrics, as well as in business, finance, political and other social sciences, and in some natural sciences.

After you finish this course, you will be able to …

- … construct and estimate models of linear relationships between multiple sequences of random variables.
- … interpret your estimates in the context of a conditional expectations function model, a linear projection model, and/or a causal model.
- … analyze the statistical properties of ordinary least squares and related estimators.
- … apply asymptotic theory to assess consistency and asymptotic normality of estimators.
- … construct, execute, and interpret statistical hypothesis tests of linear restrictions imposed on the parameters of linear models.

Prerequisite: PhD standing in Economics or instructor's consent.

Textbook: Hansen (2017). *Econometrics*. Bruce Hansen's lecture notes. Any version is an excellent reference, but lectures follow the ***January 2017*** version available on Canvas.

Topics Covered:

I. Mathematical and Statistical Tools

- Conditional Expectation and Projection (Chapter 2)
- The Algebra of Least Squares (Chapter 3)

II. Econometrics 101

- Least Squares (OLS) (Chapter 4)
- Normal Regression and Maximum Likelihood (ML) (Chapter 5)
- Asymptotic Theory (Chapters 6 & 7)
- Hypothesis Testing (Chapter 9)

Grade Composition:

HW Assignments ..... 40% of the course grade

I expect you to complete HW assignments ***on your own*** with only *limited* collaboration.

Some homework assignments later in the semester will require programming using a statistical package. I will provide sample programs and *limited* classroom instruction using R, which is open source and free. You may use an alternative software package at your own risk.

Semi-Collaborative Research Project ..... 30% of the course grade

Assigned components will be due throughout the semester. Submissions will be through Canvas and presentations will be after Thanksgiving.

Exam ..... 30% of the course grade
I plan to hold the exam at ***10:00AM-12:00PM Wednesday, December 11***. It will be a traditional "closed-book, closed notes" exam. We have some flexibility because our classroom is not centrally scheduled, so let me know as soon as possible if you have another exam scheduled on that day.

Learning technical skills and applying creativity are integral parts of a doctoral education in economics. Because I want to evaluate *your* technical skills and creativity, use of artificial intelligence such as ChatGPT is not allowed for the completion of any assignments in this course. You are welcome to raise questions or concerns with me about this policy.

Syllabus Information from the Office of the Provost:

The information below appears in Canvas under "Supports & Policies" > "MU Policies and Expectations," so that all students in all courses have access to this.

The policies included here have been approved by Faculty Council Academic Affairs and apply to all courses regardless of what statements are in course syllabi; however, there may be additional policies specific to a course or to the academic unit or college that is offering the course. When in doubt about policies and expectations, contact your instructor.

Click here for detailed information on each of these important topics:

- Decreasing the Risk of COVID-19 in Classrooms and Labs (August 9, 2022)
- Academic Integrity
- Academic Inquiry, Course Discussion and Privacy
- FERPA
- Intellectual Pluralism
- Mental Health
- Netiquette
- Religious Holidays & Accommodations
- Nondiscrimination Policy (Prohibited Discrimination)
- Students with Disabilities
- Statement for Face-to-face Courses