

# Econ 9472: Econometric Theory I

## Fall 2022

<b>Instructor</b>	Zack (J. Isaac) Miller	millerjisaac@missouri.edu
<b>Course</b>	MW 2:00-3:15PM	Locust Street Building E204A
<b>Office Hours</b>	by appointment	Locust Street Building E220
<b>Website</b>	Canvas ( <a href="https://umsystem.instructure.com/">https://umsystem.instructure.com/</a> )	

Welcome to Mizzou and to the first semester of our Economics PhD program! I rely heavily on Canvas to facilitate assignments and grading, but all lectures are planned to be face-to-face. Please note the location in the Locust Street Building, which is not reflected in MyZou.

**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 assigned exercises follow the *January 2017* version, which is available on Canvas.

**Topics Covered:** (chapter numbers correspond to the January 2017 version of the text)

- 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

Homework assignments will require programming using a statistical package. I expect you to complete HW assignments *on your own* with only *limited* collaboration.

I will provide documentation, sample programs, and *limited* classroom instruction for GAUSS. Heavily discounted options for students are available from [Aptech](#).

You may use an alternative software package at your own risk. Some past students successfully completed all assignments using R or MATLAB.

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

Completed mostly remotely and prior to Thanksgiving Break.

*Exam* ..... 30% of the course grade

The Registrar has allocated **3:00-5:00PM Monday, December 12** for our exam. 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.

**Technology Requirements:**

You will need a desktop or laptop computer to run the necessary statistical software.

It is possible – albeit very unlikely – that we will need to switch lectures to [Zoom](#) due to COVID-19. In that case, remote lectures would be given synchronously with our usual class time, and you would need a webcam and microphone.

I do not plan to record face-to-face lectures. If you need to miss class for a brief period, please get the notes from a classmate.

## **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 (June 19, 2021)
- Academic Integrity
- Academic Inquiry, Course Discussion and Privacy
- FERPA
- Intellectual Pluralism
- Mental Health
- Netiquette
- Religious Holidays & Accommodations
- Nondiscrimination Policy (Prohibited Discrimination)
- Students with Disabilities