



YILDIZ TECHNICAL UNIVERSITY
DEPARTMENT of ECONOMICS

ECONOMETRICS II

IKT3902-Gr.1

(Wednesday 10.00-12.50)

(2025-26 Spring Semester)

Syllabus



Instructor: Prof. Dr. Hüseyin Taştan

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Classnotes: <https://github.com/htastan/Econometrics-II>

Office: Davutpaşa Campus, IIBF/G2-205

Office Hours: Wednesdays 14.00-16.00

Course assistant: tba

Scope and Purpose: This course is the second part of the Econometrics sequence. While Econometrics I focused on cross-sectional data and the classical linear regression model, this course addresses the complexities of data observed over time. Real-world economic data often violate standard assumptions due to dependence, trends, seasonality, and non-stationarity. Econometrics II focuses primarily on Time Series Econometrics. We will rebuild the Ordinary Least Squares (OLS) foundation using Matrix Algebra, and then dive deep into the properties of time series data, stationarity, unit roots, and cointegration.

Learning Outcomes: By the end of this semester, you will be able to:

1. Utilize Matrix Algebra to derive and understand OLS properties.
2. Analyze Time Series Data, identifying dependence structure, trends, cycles and seasonality.
3. Detect and Correct for serial correlation and heteroskedasticity.
4. Test for Unit Roots and understand the implications of non-stationarity.
5. Model Long-Run Relationships using Cointegration and Error Correction Models (ECM).

Econometrics software: We will continue using R in class and in lab sessions. The latest version of R can be downloaded from:

<https://www.r-project.org/>

And R-studio may be used as an integrated development environment for R:

<https://www.rstudio.com/products/RStudio/>

Prerequisites: You should have successfully completed Econometrics I and Statistics I & II. This course builds upon the foundational concepts introduced in Econometrics I.

Textbook: J.M. Wooldridge (**W**), *Introductory Econometrics: A Modern Approach*, 7th ed., 2020, Cengage Learning.

R applications based on the Wooldridge's text: F. Heiss (**H**), *Using R for Introductory Econometrics*, 2016, CreateSpace. Online version and other materials available at: <http://www.urfie.net/>

Additional: J. H. Stock and M.W. Watson (**SW**), *Introduction to Econometrics*, 3rd ed., 2015, Pearson.

Evaluation: Midterms: 60% (there will be two Midterms 30% each), Final: 40%.



CLASS SCHEDULE (2026 Spring)

| Week | Date | Topics (W: Wooldridge, H: Heiss, SW: Stock and Watson) | Preparation |
|------|----------|---|-------------------------------------|
| 1 | Feb 25 | The Matrix Reboot: Review of Econometrics I. The Linear Regression Model in Matrix Form. | W: Appendix D and E |
| 2 | March 4 | OLS Properties in Matrix Form: Finite sample properties, Variance-Covariance Matrix, Gauss-Markov Theorem. | W: Appendix D and E |
| 3 | March 11 | Intro to Time Series: Nature of data, Trends, Seasonality, and basic Forecasting concepts. | W: ch. 10, H: ch.10 SW: ch.14 |
| 4 | March 18 | Time Series Regression: Finite sample properties of OLS under classical assumptions. | W: ch. 10 H: ch.10 |
| 5 | March 25 | Regression analysis using time series data (cont.) | W: ch. 10-11 H: ch.10 |
| 6 | April 1 | Stationarity and weak dependence, Moving Average (MA) process, AR process | W: ch. 11 H: ch.11 |
| 7 | April 8 | Further issues in regression analysis, asymptotic properties of OLS estimators, Highly persistent time series | W: ch. 11 H: ch.11 |
| 8 | April 15 | Midterm 1 (date and time to be announced later) | |
| 9 | April 22 | Serial correlation in time series regressions, autocorrelation tests | W: ch. 12 H: ch.12 |
| 10 | April 29 | Seriously correlated errors, GLS estimation, Heteroskedasticity in time series models, ARCH and GARCH models | W: ch. 12 |
| 11 | May 6 | Nonstationarity: Unit root tests, Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests | W: ch. 18 H: ch.18 SW: ch.14 |
| 12 | May 13 | Midterm 2 (date and time to be announced later) | |
| 13 | May 20 | Regression analysis using nonstationary variables I, Cointegration, Vector Autoregression (VAR) model | W: ch. 18 H: ch.18 SW: ch.16 |
| 14 | May 27 | No class | |
| 15 | June 3 | Regression analysis using nonstationary variables II, Error correction model (ECM), Topics in Forecasting | W: ch. 18 H: ch.18 SW: ch.16 |
| 10 | June 10 | Introduction to time series cross sectional and panel data | W: ch. 13 |