

Dr. Ozan Eruygur

### Course Syllabus

The course provides a comprehensive look to the practice of modern time series econometrics. The main topics covered: Data generating Process (DGP) unit root, main random walk forms, unit root tests, DF/ADF, Phillips-Perron, DF-GLS, KPSS, unit root tests under structural break, Perron Test, Zivot-Andrews, Lee-Strazicich, Kapetanios tests, concept of cointegration, Engle-Granger two-step cointegration analysis, error correction mechanism and model (ECM), cointegration test under structural break: Gregory Hansen cointegration test, vector autoregressive (VAR) Models, Johansen cointegration testing, vector Error correction (VECM) models, fully modified OLS (FMOLS), dynamic OLS (DOLS) and canonical cointegrating regression (CCR) estimations, ARDL approach of cointegration: bounds test, Box-Jenkins Forecasting: ARIMA Models, modelling the volatility: ARCH-GARCH-TGARCH-EGARCH modelling, filters, Hanning smoother, weighted moving averages (WMAs), exponential and double exponential (EWMA)s, Holt-Winters smoothers.

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*Recommended Books*

- *Lecture notes*
- Asteriou, D., and Hall, S. G. (2011) *Applied Econometrics*, Second Edition, Palgrave Macmillan, New York.
- Charemza, W.W., and Deadman, D. F. (1999) *New Directions in Econometric Practice*, Second Edition, Edward Elgar.

*Assessment* The course is assessed by two midterm exams, a lab exam, a term project and a final examination. The weights are as follows:

Lab Exam others	% 5
Term Project	% 40
Final Exam	% 60

*Course Home Page* The class web site can be accessed through *METU Class*. The home page will be used primarily to post lecture notes, data sets, assignments, and announcements.

*Softwares* Gretl, Stata and Excel.

*Further Requirements* You are expected to attend classes regularly.

## Course Topics

- Unit root: Main Random Walk Forms
- Unit Root Tests: DF/ADF, Phillips-Perron, DF-GLS, KPSS
- Unit Root Tests under Structural Break (Perron Test, Zivot-Andrews, Lee-Strazicich, Kapetanios)
- Concept of Cointegration
- Engle-Granger Two-Step Cointegration Analysis
- Error Correction Models
- Cointegration Test Under Structural Break: Gregory Hansen Cointegration Test
- VAR Models
- Johansen Cointegration Test
- VECM Models
- FMOLS, DOLS and other tests
- ARDL Approach of Cointegration: Bounds Test
- Modelling the Volatility: ARCH-GARCH-TGARCH-EGARCH Modelling
- Box-Jenkins Forecasting: ARIMA Models
- Forecasting Filters