

ECON 504**Applied Time Series Analysis****Summer 2015**

Section S2: MTWR 10:00 am-11:50 pm, Room 1060 Lincoln Hall

Department of Economics • UIUC

Class Web Site: <https://compass2g.illinois.edu/>**Instructor:** Ali Toossi**Office:** 205 David Kinley Hall**E-mail:** toossi@illinois.edu**Office hours:** T 2:00-3:30 pm or by appointment

Objective:

The aim of the course is to introduce a variety of statistical models for time series and cover the main methods for analyzing these models. The topics include:

- Simple descriptive techniques, trend, seasonality, the correlogram,
- Probability models for time series: stationarity, moving average (MA), Autoregressive (AR), ARMA and ARIMA models.
- Modeling volatility: ARCH & GARCH models.
- Testing for unit roots, co-integration, error-correction models
- Multiequation time-series models: intervention analysis, transfer functions models, VAR

Recommended Textbooks:

- **Enders, Walter (2014: 4th edition) *Applied Econometric Time Series* John Wiley & Sons, Inc.**
- Diebold, Francis X. (2008) *Elements of forecasting*, South-Western (Cengage Learning)
 - You can access a free copy of the book at the author's website at: <http://www.ssc.upenn.edu/~fdiebold/Textbooks.html>
- Verbeek, Marno (2004) *A Guide to modern Econometrics*, John Wiley & Sons. Inc.
- Wooldridge, Jeffrey (2000) *Introductory Econometrics: A Modern Approach*, South-Western College Publishing.
- Hamilton, J. D. (1994) *Time Series Analysis*, Princeton University Press.

Statistical Software:

The statistical software we will use is RATS. For more information about the software you can go to their web site at: <https://www.estima.com/index.shtml> . You can access the programming manual written by Walter Enders for free here: https://www.estima.com/textbook_endersprogramming.shtml .

Grades:

Grades will be based on an **exam** [in the sixth or seventh week of the course] (50%), four **problem sets** (25%), and a **research paper** (25%).

Research Paper:

The research paper can be either a review of the theoretical techniques or an applied application based on the material covered in this course. The paper should be at most 15 pages long and should include an attachment with your data and computer programs. Students are encouraged to work in groups of two.

Course Outline: The sequence or topics covered might change

Lecture	Date	Topics Covered
1,2, 3,4	June 15, 16, 17 &18	Background: Regression & Its Assumption, Hypothesis testing, Introduction to RATS
5, 6, 7	June 22, 23, 24	Traditional Approach: estimating trend, moving average, exponential smoothing, seasonality, RATS commands
8, 9, 10	June 25, 29, 30	Chapter 1: Stochastic Difference Equations
11, 12, 13, 14	July 1, 2, 6, 7	Chapter 2: ARMA Models , using ACF, PACF, AIC & SBC for model identification, Box-Jenkins Approach, stochastic seasonality, RATS commands
15, 16, 17	July 8, 9, 13	Chapter 3: Modeling Volatility (ARCH & GARCH models) , A GARCH model of PPI
18, 19, 20, 21	July 14, 15, 16, 20	Chapter 4: Modeling Trend; Stationary vs. non-stationary series, Unit roots & Random walk, spurious regressions, augmented Dickey-Fuller test, Monte Carlo simulations (downward bias in OLS estimators, critical values of DF test, power of the test), structural breaks, Perron test,
22,23	July 21, 22	Chapter 6: Cointegration; Engle-Granger method
24, 25	July 23, 27	Chapter 5: Intervention & Transfer Functions
26, 27	July 28, 29	Chapter 6: Error Correction Models
28, 29, 30	July 30, Aug 3, 4	Chapter5: VAR models
31, 32	August 5 , 6	Chapter 6: Johansen method