

**AGEC 655**  
**Time Series Analysis**

Instructor: Ken Foster

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**Course Description:**

This course is designed to improve student's abilities to estimate and interpret time series models. The course begins with univariate models and progresses to multivariate analysis. Alternative methods for identifying, estimating, and forecasting with time series models will be discussed. In addition, analysis of nonstationary time series and cointegration modeling will be covered in this course. Homework assignments will be a mix of applied estimation and forecasting of economic time series and derivations of general principles. Exams will focus on the application of methods and principles.

This course is primarily recommended for PhD level students, but it may also be appropriate for an MS student with a good background in regression analysis.

For further details contact Dr. Foster at 494-1116 or [kfoster@purdue.edu](mailto:kfoster@purdue.edu)

**Prerequisites:** AGECE 651 or consent of instructor

**Syllabus and Course Notes available at:**

<http://www.agecon.purdue.edu/academic/agec690M/index.htm>

**Office Hours:** M,T,W,Th 10:30-12

**Textbooks:**

Enders, Walter. *Applied Econometric Time Series*, John Wiley & Sons, Hoboken, NJ. 2003.

Hamilton, James D. *Time Series Analysis*, Princeton University Press, Princeton, NJ. 1994.

**Time and Place:** TTH 9-10:20 in Rawls 1071

**Grading:** Course grades will be assigned based on the following weights 20 % Exams (Midterm and Final), 40 % Problem Sets, and 40 % Project. The final grading scale will be as follows:

90 – 100 %	A
80 – 89 %	B
70 – 79 %	C
60 – 69 %	D
<60%	F

**Brief Project Description:** The project will involve collection and analysis of time series data using one or more of the methods covered in class or other appropriate methods. The focus of the analysis should be on forecasting, explanation of a significant economic, natural, or physical phenomenon and/or control of a dynamic system.

**Brief Course Outline:**

- I. Structural Time Series Models (Kmenta Ch. 11)
  - Finite Distributed Lag Models
  - Infinite Distributed Lag Models
- II. Introduction
  - Dynamics, Stability, and Multipliers [Hamilton Ch. 1&2, Enders Ch 2]
  - Reconciling Structural and Time Series Models
- III. Stationary Time Series
  - Univariate (AR, MA, ARMA) [Hamilton Ch. 3, Enders Ch. 2]
  - Pattern Recognition [Enders Ch. 2]
  - Identification, Estimation, and Forecasting [Hamilton Ch. 3,4,&5, Enders Ch. 2&3]
  - Covariance Stationary Vector Processes (VAR, VARMA) [Hamilton Ch. 10&11, Enders Ch. 5]
  - First Order Augmentation
  - Bayesian VAR [Hamilton Ch. 12]
  - State Space (Kalman Filter, Aoki) [Hamilton Ch. 13 and other readings]
- IV. Nonstationary Time Series
  - Trend vs. Difference Stationary [Hamilton Ch. 15, Enders Ch. 4]
  - Processes with Deterministic Time Trends [Hamilton Ch. 16, Enders Ch. 4]
  - Unit Root Tests [Hamilton Ch. 17, Enders Ch. 4]
  - Distributional concerns
  - Cointegration and Error Correction [Hamilton Ch. 19 & 20, Enders Ch. 6]
- V. Nonlinear Time Series
  - Deterministic Time Varying Parameters
  - Threshold models
  - Smooth Transition Autoregressions
- VI. Autoregressive Conditional Heteroscedasticity (ARCH, GARCH) [Hamilton Ch. 21, Enders Ch. 3]