Course Description:
This course is designed to improve student’s abilities to estimate and interpret time series models. The course begins with structural univariate time series models and progresses through multivariate models. Alternative methods for identifying, estimating, and forecasting with time series models will be discussed. Interpretation of results, characterization of underlying dynamics and consistency with economics will be emphasized. 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 and MS students with interest in continuing for a PhD or a career in analytics. All students need a strong background and interest in applied regression analysis and statistics.

For further details contact Dr. Foster at 494-1116 or kfoster@purdue.edu

Prerequisites: AGEC 651 or consent of instructor

Office Hours: Tuesdays 2:30-4:30 p.m.

Textbooks:
Required
Instructor’s Notes: Download from Blackboard.

Key Reference and Reading Material

Time and Place: TTH 4:30-5:45 PM in RAWLS1071

Instructor Discretions: The instructor reserves the right to change course content and grading weights and assignments but will clearly and promptly inform students of any such changes. The instructor reserves the right to remove any student from the classroom and course for rude, disrespectful, or threatening behavior toward other students or the instructor. The instructor will give a failing course grade to any student caught cheating or plagiarizing and refer such charges to the appropriate University authorities.
Grading: Course grades will be assigned based on the following weights 30 % Exams (Midterm and Final), 40 % Problem Sets, and 30 % 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. 11.4, Kmenta Ch. 13.1, Hamilton Ch. 1&2, Enders Ch 1&5.1-7]
   - Finite Distributed Lag Models
   - Infinite Distributed Lag Models
   - Structural, Reduced, and Final Form Models
   - Dynamics, Stability, and Multipliers
   - Structural Vector Autoregressions [Enders Ch. 5.10-14, Hamilton Ch. 11.6]
   - Reconciling Structural and Pure Time Series Models [Notes]

II. Univariate Pure Time Series Models
   - Univariate (AR, MA, ARMA) [Hamilton Ch. 3,4,&5, Enders Ch. 2]
   - Models With Trend  [Hamilton Ch. 15,16,&17, Enders Ch. 4]

III. Multivariate Pure Time Series Models
   - Covariance Stationary Vector Processes (VAR, VARMA) [Hamilton Ch. 10&11, Enders Ch. 5]
   - First Order Augmentation [Notes]
   - Bayesian VAR [Hamilton Ch. 12]
   - State Space (Kalman Filter, Aoki) [Hamilton Ch. 13 and other readings]
   - Cointegration and Error Correction [Hamilton Ch. 18,19 & 20, Enders Ch. 6]

IV. Nonlinear Time Series [Hamilton Ch. 20, Enders Ch. 7]
   - Deterministic Time Varying Parameters
   - Threshold models
   - Smooth Transition Autoregressions

V. Modeling Volatility [Hamilton Ch. 21, Enders Ch. 3]