36-472, TIME SERIES ANALYSIS & FORECASTING  
SYLLABUS FOR FALL 2011  

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COURSE: Wilson & Keating, Business Forecasting (required).  
MATERIALS: Diebold, Elements of Forecasting or any Econometrics text  
(highly recommended)  
SHAZAM Econometric software program.  

COURSE PREREQUISITES: Econ 210, with a grade of "C" or better.  

This is a course in economic research, using time series data. In this course you will be doing your own research project, and in the process become acquainted with the statistical techniques most used by empirical economists. You will, by the end of the course, be able to generate statistical forecasts using a variety of tools and methodologies.  

Topic | Evaluation | Chapters  
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The Forecasting Process | | WK 1, 2; D 1, 3, 4  
Data Smoothing | | WK 3; D 13  
Moving averages  
Exponential, Holt, Winters  
Times Series Decomposition | WK 6  
Statistics Review | WK 2; D 2  
Univariate Regression models | |  
Linear Regression | WK 5  
Linear/Nonlinear trends | D 5  
Seasonality | D 6  
AR, MA processes | WK 7; D 7, 8  
Testing for Autocorrelation | |  
Forecasting | |  
Exam #1 | |  
Forecast paper #1  
Forecast paper #2?  
Exam #2?  
Forecast paper #3?  
Multivariate Regression | |  
Unit roots | D 13  
Lags and distributive lags | D 11  
Combining forecasts | WK 8; D 12  

Evaluation:  
Data analysis techniques can be discussed, but to gain any degree of mastery, they must be practiced. So, to give you practice, I will be assigning a number of exercises throughout the course. These will be graded primarily on their completeness. Two or three tests will be administered, all primarily focusing on hypothesis testing.  

In addition, as stated above, since this is a course in economic research, you will be doing your own times series research project. The project will involve forecasting three different variables, for any one company. The choice of the variables that you will forecast is up to
you. However, as part of your first exercise, I will be suggesting variables for you to use. If you would prefer to use other variables, or other data from other sources than the ones recommended in Exercise 1, you must get my OK. I do not want you to waste your time with data that is not appropriate to the methods you will be learning.

As part of your research project, 3 papers will be due. The first will report three forecasts for each of your three variables, using data smoothing techniques. You should discuss all the forecasting techniques you considered, and why the three forecasts you report may be the most appropriate for your data. For each variable, you should discuss which forecast you think best, and why. Your report should include a cover letter, and a 1 page Executive Summary of your findings.

The second paper will add a univariate regression forecast for each of your three variables to your paper. Again, you should discuss which of your four forecasts is best, and why. Again, the report should include a cover letter, and a 1 page Executive Summary of your findings.

The third paper will add a multivariate regression forecast, as well as a combined forecast. You will once again be expected to compare your several forecasts, and explain which is best. Once again, the report should include a cover letter, and a 1 page Executive Summary of your findings.

Each paper will be graded separately. I would expect, since you will be repeatedly modifying the same report, that shortcomings in the first paper will have been addressed when you turn in the second paper, and so on. Failure to make improvements may not be looked upon kindly!!!!

WRITING A TIMES SERIES REPORT

A research paper is not unlike any other paper: it has an introduction, a body, and a conclusion. Unlike other papers, however, it will contain information on your statistical procedures and findings, which must be presented in a way that is both sufficiently complete to be replicable and sufficiently summarized to be easily readable. The typical components of a times series research paper are:

A. **The Introduction:** In this section you describe the variables you are forecasting, and why this is an important thing to do.

B. **Description of Procedures:** You explain the models you have investigated. This should be complete enough that another researcher could replicate your results, but sufficiently nontechnical and jargon free to be intelligible to a nonspecialist.

C. **Presentation of Your Forecasts:** Presentation of your forecasts in table form, as well as in graphical form.

D. **Evaluation of Your Forecasts:** For each variable, you should discuss which forecast you think best, and why. Again, you need to find a balance between completeness and nontechnicality.

E. **Conclusion:** This section summarizes the papers findings. Focusing just on the best forecasts, or on the common features of all the forecasts, might be a good strategy.

The Executive Summary will pull information from all of these sections. However, it will chiefly recap the introductory and conclusion parts of the report.