Time Series Analysis

Fall 2008

Course Syllabus

Instructor: Dr. Jayawardhana
Office: 207 Yates Hall
Office Hours: Check the timetable below
Class web page:

Phone: 235-4414
e-mail: ananda@pittstate.edu

Text: Business Forecasting, Ninth Edition by John E. Hanke and Dean W. Wichern

References:

1. SOA/CAS Course 4: Regression, Forecasting, and Time Series: A Study Guide by J. S. Mehta & David R. Hill

2. Introduction to time Series and Forecasting by Brockwell, Peter J. and Davis, Richard A.

3. Forecasting Examples for Business and Economics Using the SAS System, SAS Institute Inc.

3. The Little SAS Book by Delwiche, Laura D. and Slaughter, Susan J.

Prerequisites: Math 153 or Math 155 or equivalent and Math 153 or Math 543 or equivalent

Software: MINITAB and SAS for those who are interested
Buy MINITAB from e-academy for 6 months

Objectives: This course will give a systematic and in-depth understanding of modern principles and applications of forecasting.

Coverage: From Business Forecasting by Hanke and Reitsch

Ch. 1 Introduction to forecasting **(Reading)**

Ch. 2 A review of basic statistical concepts **(Reading)**

Ch. 3 Exploring data patterns and introduction to forecasting techniques

Ch. 4 Moving averages and smoothing methods

Ch. 5 Time series and their components

Ch. 6 Simple linear regression

Ch. 7 Multiple regression analysis

Ch. 8 Regression with time series data

Ch. 9 The Box-Jenkins (ARIMA) methodology

From “SOA/CAS Course 4: Regression, Forecasting, and Time Series: A Study Guide by J. S. Mehta & David R. Hill”

Ch. 4 Time Series Analysis

Ch. 5 Additional Examples

Some theoretical background from “Introduction to time Series and Forecasting by Brockwell and Davis”

Ch. 1 Introduction
Ch. 2 Stationary Processes
Ch. 3 ARMA Models
Ch. 4 Spectral Analysis
Ch. 5 Modeling and Forecasting with ARMA Processes
Ch. 6 Nonstationary and Seasonal Time Series Models.
Ch. 9 Forecasting Techniques.

Group Project # 1

Critique the statistical analysis of the following article.
Reference: Timpone, R. J. (1995), “**Mass Mobilization or Government Intervention? The Growth of Black Registration in the South**,” Journal of Politics, Vol. 57, No. 2, pp. 425-42.

Group Project # 2

Critique the statistical analysis of the following article.
Reference: Lawrence E. Cohen, Kenneth C. Land (1987), “**Age Structure and Crime: Symmetry Versus Asymmetry and the Projection of Crime Rates Through the 1990s**,” American Sociological Review, Vol. 52, No. 2., pp. 170-183.

Group Project # 3

Critique the statistical analysis of the following article.

Reference: Lawrence E. Cohen, Marcus Felson, Kenneth C. Land (1980), "**Property Crime Rates in the United States: A Macrodynamic Analysis, 1947-1977; With Ex Ante Forecasts for the Mid-1980s**," American Journal of Sociology, Vol. 86, No. 1., pp. 90-118.

Advanced Group Project # 1

Critique the statistical analysis of the following article.

Reference: Fabio Canova and Takatoshi Ito (1991), "**The Time-Series Properties of the Risk Premium in the Yen/Dollar Exchange Market**," Journal of Applied Econometrics, Vol. 6, No. 2., pp. 125-142.

Evaluation:	Five (or) four exams	= 500 (or 400) points
	Quizzes	= 100 points
	Homework and Projects	= 200 points
	Paper (and Presentation)	= 25 points

Grading Scale:	90% - 100%	= A
	80% - 89%	= B
	70% - 79%	= C
	60% - 69%	= D
	<60%	= F

Instructor keeps the right to lower the scale if necessary.

Regular attendance is expected, but it is not counted in your grade. Exam dates will always be announced at least a week ahead of time. There will be at least one quiz every week. No make-up will be given for these quizzes unless prior arrangements are made with the instructor. Daily homework assignments will be made. **Homework will be collected on due dates and all the problems will be graded.** At the end, quizzes will be scaled to 100 points and homework and projects will be scaled to 200 points. No tests will be made up except for absences due to official university activities or health problems with a Dr.'s excuse. If you have a special need addressed by the **American with Disabilities Act**, please notify me immediately so that appropriate accommodations can be provided. Instructor keeps the right to make changes in the coverage.

Semester Papers and Class Presentations

These papers should be from about 10 pages in length (double-spaced, font size 12). If you are writing about a chapter from the class text, make sure you find an article, which uses one of the methods you discuss in your paper. You have the choice to select your own topic. If you do so please let me know in advance.

1 Qualitative forecasting techniques like Delphi Method
Linstone, H.A. Delphi Method, 001.433D385 (Axe Library)

2 ARCH/GARCH Models
Bollerslev, T. (1986), "Generalized Autoregressive Conditional Heteroskedasticity," Journal of Econometrics, 31, 307-327.

Engle, R. (1982), "Autoregressive Conditional Heteroskedasticity Estimates of the Variance of United Kingdom Inflation," Econometrica, 50, 987-1007. (JSTOR)

Engle, R. (2001), "The Use of ARCH/GARTH Models in Applied Statistics, Journal of Economic Perspective," Vol. 15, Issue 4, 157-168.

3 Time Series in Political Science

Haynie, S. (1992), "A Leadership and Consensus on the U.S. Supreme Court," Journal of Politics, 54(4), 1158-1169. (JSTOR)

Suzuki, M. et. al., (1996) "The rationality of Economic Voting Revisited," Journal of Politics, 58(1), 224-236. (JSTOR)

4 Time Series in Economics

Andrew B. Bernard, Charles I. Jones (1996), "Productivity Across Industries and Countries: Time Series Theory and Evidence," The Review of Economics and Statistics, Vol. 78, No. 1., 135-146. (JSTOR)

5 Time Series in Sociology

William C. Bailey, Ruth D. Peterson (1989), "Murder and Capital Punishment: A Monthly Time-Series Analysis of Execution Publicity," American Sociological Review, Vol. 54, No. 5., 722-743. (JSTOR)

David Jacobs, Ronald E. Helms (1996), “Toward a Political Model of Incarceration: A Time-Series Examination of Multiple Explanations for Prison Admission Rates,” American Journal of Sociology, Vol. 102, No. 2. , 323-357. (JSTOR)

6 Dickey and Fuller Test

David A. Dickey, Wayne A. Fuller (1979), Distribution of the Estimators for Autoregressive Time Series With a Unit Root,” Journal of the American Statistical Association, Vol. 74, No. 366., 427-431.

Literature Survey

Learn how to search online databases.

Learn how to request an inter-library loan.

We have access to many databases including JSTOR (one of my favorites). In JSTOR, search for Time Series. There may be several hundred papers. Read a few and select one article for your presentation.

Time series is a vast subject and its applications can be found in many areas of social sciences. Since we have covered only a limited number of topics during this semester, you may encounter many new concepts in research papers. I will help you to understand those topics if possible.

Instructor’s Time-table

	Monday	Tuesday	Wednesday	Thursday	Friday
8.00-8.50 MWF 8.00-9.00 TTH	Math 143-01 (WL) YH 215	Office	Math 143-01 (WL) YH 215	Office	Math 143-01 (WL) YH 215
9:30-10.45 TH	Office	Math 749 Yates 216	Coffee	Math 749 Yates 216	Office
10.00-10.50 MWF	Math 543 YH 106		Math 543 YH 106		Math 543 YH 106
11.00-12.00 TH	Office	Office	Office	Office	Office
12.00-12.50 MWF	Math 143-04 (WL) YH 215	Lunch	Math 143-04 (WL) YH 215	Lunch	Math 143-04 (WL) YH 215
1.00-2.00	Lunch		Lunch		Lunch

* Note that from 2.00 p.m. to 4.00 p.m. there are other commitments such as independent studies, departmental meetings, departmental colloquia etc. You are encouraged to use the office hours allocated before 2.00 p.m. If my office hours conflict with your other classes please let me know.

Other Issues

Please take clear notes.
Please let me know if I am going faster than your pace.
Please participate in class activities.
Please ask questions in class, after the class or in my office.
Please answer my questions and participate in class.
Please make friends in class and share notes, study together etc.
Please use my office hours anytime you need help. I care about you and your success.
I am open to your reasonable suggestions.