ECO511: Business and Economic Forecasting
Autumn, 2017
Lewis Center 1309, (Wednesday 5:45-9:00) updated: 8/30/2017

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The best way to reach me is to send email. Please use ECO511 as a prefix on the subject line, and that will get my attention immediately. If you don't receive my reply within 24 hours, please remind me again. Due to many email filters and mass email, your email might be lost.

OFFICE HOURS: Monday and Tuesday 4:00- 5:00 or by appointment (at DPC 6230)

COURSE OBJECTIVES
This course surveys a number of quantitative techniques commonly used to forecast business and economic variables. Emphasis will be on the applications of time series regression model using economic and financial data instead of theoretical aspects. Topics include smoothing techniques, regression and econometric analysis, Box-Jenkins time series, Volatility forecasting, and discrete decision and prediction model. At the end of the course, participants will be able to use these skills to produce a fully processed data set compatible for building powerful predictive models that can be deployed to increase profitability.
PREREQUISITE(S): GSB 420 or ECO 375 or equivalent is a prerequisite for this class.

The example data will be from the typical website, such as yahoo.com or wsj.com, and public website such as FRED (Federal Reserver Economic Data) maintained by St. Louis Federal Reserve Bank. We will use currently available data from website and extract them into SAS program. This course will teach you higher level of SAS program skills as well as methodologies to understand the time series process in economics and finance.

REQUIRED MATERIAL Lecture notes and mandatory reading list in D2L. All files are available for download in PDF format from D2L.

SUPPLEMENTARY MATERIAL

- Analysis of Financial Time Series, Ruey S. Tsay, 2-3rd Edition.
- Elements of Forecasting, Francis X. Diebold, 4th edition, earlier version in PDF can be found
  http://www.ssc.upenn.edu/ fdiebold/Teaching221/FullBook.pdf
- Applied Econometric Time Series Analysis, Walter Enders 3rd-4th Edition
- Time Series Analysis Forcasting and Control, George E. P. Box, Gwilym M. Jenkins, Gregory C. Reinsel, and Greta M Ljung, 5th Edition, Wiley
- Introductory Econometrics A Modern Approach (Selected Chapter in Time Series), 4-5th Edition, Jeffery M. Wooldridge.

SOFTWARE USED in CLASS (required for homework and lab classes)
This course will extensively use the statistical package, SAS. SAS will be available in most of computer labs. However, it is strongly recommended to install SAS on your computer for regular exercise and homework. We will cover how to obtain, install, and run SAS in class. Any prior knowledge on SAS is not required.

GRADE
Midterm Exam (25%), Financial Data Analysis Project (20%), Final Project (25%), Computer LAB Assignment and attendance (10%), Homework (20%), Extra credit Pop-up Quizzes(1-5%),
Scale of grade: A: 93 or above, A-: 88-92.9, B+: 85-87.9, B: 80-84.9, B-: 77-79.9, C+: 75-76.9, C: 70-74.9, C-: 68-69.9, D+: 65-67.9, D: 60-64.9, F: Below 60

EXAMS AND FINAL PROJECT SCHEDULE

- Midtem Exam
- Financial Data Analysis Project
- Final Project (Written report submission to D2L on November 19 at 10:00 PM)

ASSIGNMENTS

- Lab Assignments: All assigned work needs to be uploaded to D2L. If the work cannot be done in the lab class, one more revised version can be uploaded after class.
- Homework: Problem set will be posted in D2L and collected before class. Only in-class submission will be allowed.
  - All assignments are to be prepared individually unless otherwise stated by me. You risk an academic integrity violation if submit the same work and answers with others. Group study is encouraged but not the submission of homework.
  - Assignments are graded based on completion and efforts. Failure to answer any questions or nonsensical attempts at answering questions will result in an incomplete assignment.
  - No Late submission will be allowed since we will discuss about the homework in class. Only limited exception will be granted due to emergency and extraordinary circumstance proved by appropriate document.
- Popup Quizzes: We will have extra credit popup quizzes in class. All require to submit the answers or sign-up sheet before leaving class.

COMPUTER Exercise Topics We will have the computer exercise in each class related with the topics covered.

ACADEMIC HONESTY
Work done for this course must adhere to the University Academic Integrity Policy. Violations include but are not limited to the following categories: cheating; plagiarism; fabrication and academic misconduct.

- Cheating: any action that violates University norms or an instructor's guidelines for the preparation and submission of assignments. Such actions may include using or providing unauthorized assistance or materials on course assignments, or possessing unauthorized materials during an examination.

- Plagiarism: the representation of another's work as your own. You are to prepare your own homework assignments. Violations may result in the failure of the assignment, failure of the course, and/or additional disciplinary actions.

- Misconduct: This includes but is not limited to attempts to bribe an instructor for academic advantage; persistent hostile treatment of, or any act or threat of violence against, an instructor, advisor or other students. Violations may result in additional disciplinary actions by other university officials and possible civil or criminal prosecution.

You may review the Academic Integrity Policy in the Student Handbook or by visiting Academic Integrity at DePaul University (http://academicintegrity.depaul.edu)

ATTENDANCE POLICY

I do not take attendance. The attendance will be automatically checked by in-class quizzes. Excuses on exam days may be considered under extraordinary circumstances provided by official documentation.

CLASSROOM RULES & PROFESSIONAL POINTS

- Prohibitions: Cell phones must be turned OFF. Use of the internet is not permitted unless specifically directed by me. This includes checking of email and use of instant messengers. You must sit at the front of the classroom if you are using a computer. Tape recorders, unrelated reading materials, and food are also prohibited in the classroom.

- Behavior: You may not leave the classroom for any reason during an exam (go to the bathroom beforehand!). Further, unprofessional behavior such asinappropriate chatting, leaving in the middle of class, or showing up excessively late, etc. are disruptive and unacceptable. If you need to leave class early, let me know in advance.

- For first time violations you will receive a warning. In the event that violations continue, I will ask you to leave the classroom. (I reserve the right to add to this list as situations arise.)

Student with Disability: Students with Disability may register the The Productive Learning Strategies (PLuS) Program. You may request your exam schedule arrangement by requesting through the PLuS program. For more information on the PLuS program, you may visit http://studentaffairs.depaul.edu/plus/ or call: 312-362-8000.

TENTATIVE SCHEDULE OF TOPICS
(The instructor may change the order or contents by needs, any special material needs for class will be available on D2L)

- Time Series Data Analysis
  - **Topic 1: Regression Analysis and Forecasting**
    Introduction Business Forecasting
    Quick Review on the regression model
    Regression and Forecasting
  - **Topic 2: Data Analytics using SAS**
    Statistical Analysis in SAS
    SAS programming to read Yahoo.com and FRED (Federal Reserve Economic Data)
    Introduction to SAS Macro programming
  - **Topic 3: Trend, Seasonality, and Smoothing in Time Series**
    Detrend, Seasonal Difference, and Exponential Smoothing Methods
    Example Data: Automobile Sales, Crude Oil Prices, Real GDP and Consumption, Stock Market Index
  - **Topic 4: Stationary and Nonstationary Time Series**
    Unit Root test, Random Walk, Random Walk with Drift
    SAS Macro programming for Unit Root Test
- Univariate Time Series Model and Forecasting
  - **Topic 5: Introduction to Forecasting and Diagnostic Test on white noise, AR, MA, ARMA, and ARIMA models**
    Stock prices and Stock market index Analysis using ARIMA Models
    SAS Macro programming for ARIMA and model Selection
- Midterm Exam
- Financial Data Analysis - Asset Volatility Model (GARCH)
  - **Topic 6: ARCH/GARCH Family Models**
    Volatility in stock market
    Symmetric and Asymmetric GARCH Models in SAS
  - **Topic 7: Forecasting Model with Volatility**
    ARIMA and GARCH model performance in stock index and stock price
    SP500 and VIX index forecasting model
- Financial Data Analysis Project Due
- Multivariate Macro Forecasting Models

- **Topic 8: Multivariate Time Series Model**
  VAR (Vector Autoregressive Model) Model
  Impulse Response Function
  Cointegration and Vector Error Correction Model

- **Individual Project Presentation**

- Final Project Due
  Written report submission to D2L until November 15 at 10:00 PM