**Course Description/Overview:**

This course is an introduction to time-series econometrics and forecasting based on statistical analysis of economic data, with a balance of theory, and applications, and a focus on original research. This is a writing-intensive course with a substantial research thesis that accounts for 50% of the final grade. The course starts with a revision of stationary time-series, not covered in the main text for the course; for the rest, the course will focus on key components of a time series such as trend, seasonality and stochastic cycles, with applications to real world examples emphasized throughout this class. Students will learn how to choose a model to describe each component of a time series, use it to forecast the series, and evaluate the quality of the forecast prediction. The empirical project will give you a chance not only to apply the material learned during the semester, but learn how to turn your course project into a written piece of academic-style research. This course relies on frequent computer-based classes, so you must have your own computer installed with the statistical software for Stata.

**Textbook:** F. Diebold *Elements of Forecasting* 4th edition

This book will not be available in a new edition from cengage. The author has provided an online to access the 4th edition as well as an edition that he intends to revise to keep the text up-to-date. This online editions are free to download from [http://www.ssc.upenn.edu/~fdiebold/Textbooks.html](http://www.ssc.upenn.edu/~fdiebold/Textbooks.html)


**Software:** For some of the assignments, especially for your course research project, you need to analyze data using some statistical package. I recommend Stata, available on all computers in the econ lab and in Cox-Hall. If possible, I highly recommend that you buy the student version as the price is really very good, comes with a perpetual license, and your work outside this course will also benefit from using it. There will be time-series and forecasting applications by Stata in some of our regular classes, and also frequent sessions in the computer lab classes.

**Exams & Paper:** There will be one midterm exam, a final exam, a major research paper. Three additional mandatory homework will also be given during the semester. Your are encouraged to submit work on the homework assignments in pairs. Please write the names of all members of your group on the hard copy submitted. Your grade will be determined by a cumulative score derived using the following weights:
1. Midterm 10%
2. Final 20%
3. Econometric project 50%
4. Three Problem sets 9%
5. In-class quiz 6%
6. Class Contribution 5%

The distribution of the grades will be as follow:
>95    A
90-95  A-
87-90  B+
84-87  B
80-84  B-
77-80  C+
74-77  C/S
70-74  C-
67-70  D+
60-67  D
<60    F

Those taking the course on the pass/fail basis need to make at least a ‘D’ to get an ‘S’(satisfactory) grade.

*Econometrics Project paper:* You will choose a subject early on in the course and complete an applied project during the semester. However, this course requires a research thesis with a focus on the process of writing it, not just on submitting a final paper. To that end, you will write *three* drafts of the paper with strict deadline set for at each stage in order to incorporate revision and improvement as you go ahead. For a good final text, I recommend you do the followings as soon as possible
   b. Consult the Emory Writing Center Website
   c. Sign-up for a conference with a tutor from the Writing Center

The econometric research must be conducted in Stata, The paper will be graded on multiple aspects: writing style, content, econometric and statistical analysis. It must display the student’s ability to apply some of the key tools and concepts of time-series of econometrics and forecasting, and correctly interpret the results. The submitted final thesis will be a polished paper of about 20 page (including tables and graphs) written in good, clear English with proper grammar, spelling, punctuations, etc.

*Expectations:* This course provides treatments of topics which may be, at times, quite complicated. Therefore, regular attendance and active participation will be critical to your understanding of course material; a part of the final grade is allocated to active participation, and naturally on attendance. Any student with more than four absences will have his/her final score moved down by one grade, e.g. from B+ to a B; more so if the number of missed classes go well beyond four. Please hand in your assignment on time in class in hard copy; as a general rule, I do not accept emailed submission. Please make sure to write the course **ECON 422** on the front page; *especially any email communication with me must contain the ECON 422 course number*. There will be **NO make-up examination**, reasons such as travel arrangements, or athletic events, etc. are **not** acceptable. Missed midterm exam will receive the same score as the final; and all students must take the final exam in order to pass. If something totally unexpected comes up, contact me as soon as possible. No food is allowed in the class. **Absolutely NO electronics** may be used, and all electronics must be turned off, in the classroom during class and exam times. Use a small, non-graphing, basic function calculator that lacks the ability to store information for use during in-class exercises and exams. Use of graphing calculators, cell phones, etc. will not be permitted.
**Academic honesty**: Nothing less than exemplary behavior with respect to academic honesty is Expected; any deviance from such behavior will have dire consequences for your course grade. As such, any and all instances of suspected academic dishonesty will receive serious attention.

**Honor Code**
Upon every individual who is a part of Emory University falls the responsibility for maintaining in the life of Emory a standard of unimpeachable honor in all academic work. The Honor Code of Emory College is based on the fundamental assumption that every loyal person of the University not only will conduct his or her own life according to the dictates of the highest honor, but will also refuse to tolerate in others action which would sully the good name of the institution. Academic misconduct is an offense generally defined as any action or inaction which is offensive to the integrity and honesty of the members of the academic community.

- The Honor Code, a list of offenses and the Honor Council process may be found; [http://college.emory.edu/home/academic/policy/honor_code.html](http://college.emory.edu/home/academic/policy/honor_code.html)

A tentative list of the topics that will be covered during the semester is given below:

1. Review of stationary time-series
2. The use of statistical graphics for forecasting
3. Basics of Forecasting
4. Modelling and forecasting deterministic trend and seasonality
5. Cycles, covariance stationarity and white noise processes
6. The use of the lag operator, MA, AR, and ARMA models
7. Forecasting with AR, MA, and ARMA
8. Random Walk, Unit Roots and stochastic trends,
9. Differencing, ARIMA and Cointegration
10. Time-varying Volatility and financial econometrics

### Important dates:
- **Wen Sept 21**th Project proposal topic and sources of data (2 pages)
- **Wen Oct. 7**th Project: 1st draft (10 pages)
- **Wen Oct. 21**th Midterm
- **Wen Oct. 28**th Deadline to submit 2nd draft of the proposal (around 15 pages)
- **Mon Nov. 30**th Final Deadline to submit project
- **Thr Dec. 10**th Final Exam (8.00am-10.30am)

### Instructions for the paper
You should start thinking of an idea for your paper right away. You will have to collect the data on your own, so you will need to check that the data you have in mind is easily available. A great idea will not get you too far if you find out shortly prior to the paper due date that the desired data does not exist. On submission of your proposal, you will need to demonstrate that you have the data in hand. Although I would prefer you to come up with an idea or your own, I am available to assist in formalizing an idea or finding data. One possible source for data is the Internet, where a huge amount of data is available for free. In this class we will mostly look at Time Series, so you will be able to apply what we learned in class only if you collect this kind of data. For example, baseball statistics for different teams will not work, while US GDP over time would be suitable. The paper will be graded on the content, style, and clarity of exposition with fairly equal weights. Make sure you spell-check your paper before you turn it in. The paper should include separate sections for each of the following: Abstract, Introduction, Data Description, Empirical Methods, Results, Conclusion, and References. You can place tables and graphs directly in the
text or you can combine them at the end of paper in between the Conclusion and References sections.

The Abstract includes a brief synopsis of your paper. This section should be on the same page of the title (10-point font, 1.5 lines spaced). The rest of the paper should be typed at 12-point font double-spaced. The Introduction is used to explain the background of your paper, why it is important, and to explain in further detail what your paper is going to show. Data Description includes a detailed description of the data, including source and frequency. The Empirical Methods section is used to explain the empirical methods used in your analysis. This section needs to be precise so anyone reading your paper should be able to obtain the same data, follow your methods, and replicate your results exactly. The Conclusion needs to clearly state your results and concluding remarks, and your References need to be formatted in the standard method. All the sections should be numbered (I-V) with the exception of the Abstract and your References sections. All the pages have to number starting from 0, which is the number for the title/abstract page. The number on the title page should not be visible. Any data used, methodology employed, or argument advanced that is not your own must be cited. You reference a source in the body of your paper by stating the name of the author and the publication year (e.g. Hansen (1995)). You must include all references that you have cited in the paper listed in alphabetical order in the References section of your paper. The following page is an example of a title/abstract page. I am also giving you examples of how to reference articles and books.
Elements of Forecasting Applied to GDP.

Francis Diebold
Department of Economics
New York University

Fall 2014

Abstract

Here you can write the abstract. It should not be too long and should include a brief introduction explanation of the results you find. It should be self explanatory, simple and captivating such that it invites the reader to continue with the rest of the paper. You could have up to 10-12 lines here.
How to reference a book:


How to reference articles:


