

Economics 413: Economic Forecast & Analysis  
Department of Economics, Finance and Legal Studies  
University of Alabama  
Fall, 2023

Professor: Daniel J. Henderson  
Lecture: TR 11:00 – 12:15 pm, Bidgood 115  
Office: Alston 262  
Office Hours: TR 1:45 – 2:45 pm or by appointment  
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Course Description:

This course deals with the analysis of univariate and multivariate time series data. The course will focus on the modeling of stationary and linear models within the Box-Jenkins framework for which optimal forecasts will be constructed. Nonstationary models will also be analyzed, together with topics such as unit roots and cointegration.

Textbooks:

Forecasting for Economics and Business, First Edition  
Gonzalez-Rivera, Pearson, 2013, ISBN 9780131474932 (Recommended)

Elements of Forecasting, Fourth Edition  
Diebold, South-Western: 2007, ISBN: 9780324359047 (Recommended)

Applied Econometric Time Series, Third Edition  
Enders, Wiley: 2010, ISBN: 9780470505397

Time Series Analysis: Forecasting and Control, Third Edition  
Box, Jenkins and Reinsel, Prentice Hall: 1994, ISBN: 0130607746

Introduction to Econometrics, Fourth Edition  
Maddala and Lahiri, Wiley: 2009, ISBN: 9780470015124

Introductory Econometrics, Fourth Edition:  
Wooldridge, South-Western: 2009, ISBN: 9780324660545

Prerequisites:

(Undergraduate level EC 308 Minimum Grade of C- or Undergraduate level EC 310 Minimum Grade of C-) and (Undergraduate level EC 309 Minimum Grade of C- or Undergraduate level EC 311 Minimum Grade of C-).

## Learning objectives:

Explain core concepts and techniques in forecasting, with a special focus on the Box-Jenkins methodology

Understand the assumptions upon which different econometric methods are based and their implications

Use statistical software to implement the various techniques taught employing secondary data and demonstrate ability to analyze and assess empirical results

Interpret and critically evaluate applied work and econometric findings

## Grading Policy:

The course will consist of several homework assignments, two in-class midterm examinations and one comprehensive final examination. The course grade will be determined according to the following formula:

Homework	20%
Midterm I	25%
Midterm II	25%
Final Exam	30%

Note that homework assignments will require the student to use a statistical software package and to turn in output from that package. Simply writing down answers from the course website is not acceptable. Further note that no late assignments will be accepted.

No make-up exams will be given. If a student misses a homework or an in-semester midterm examination for any reason, the weight of that assignment will be added to that of the final examination (e.g., missing Midterm I would make the final worth 55% of the course grade).

## Attendance Policy:

Students are expected to communicate directly with their course instructor regarding all attendance conflicts or concerns.

## Course Outline:

### Review of the Linear Regression Model

- Gauss-Markov Assumptions
- Ordinary Least Squares
- Coefficient Interpretation
- Goodness-of-Fit
- Statistical Inference
- Maximum Likelihood Estimation

### Mathematics for Forecasting

- Difference Equations
- Lag Operators
- Higher-Order Difference Equations

## Stationary Models

- ARMA Processes
- Forecasting
- Multivariate Time Series Models

## Nonstationary Models

- Time Trends
- Unit Roots
- Spurious Regression and Cointegration

## Relevant Chapters from Gonzalez-Rivera:

- Chapter 2: Linear Regression Models
- Chapter 3: Mathematical Preliminaries
- Chapters 6-7: ARMA Processes
- Chapters 8-9: Forecasting Stationary Models
- Chapter 10: Unit Roots
- Chapter 11: Multivariate Nonstationary Models

## Relevant Chapters from Diebold:

- Chapter 2: Linear Regression Models
- Chapter 7: Mathematical Preliminaries
- Chapter 8: ARMA Processes
- Chapters 9-12: Forecasting Stationary Models
- Chapter 11: Multivariate Stationary Models
- Chapter 13: Unit Roots
- Chapter 13: Multivariate Nonstationary Models

Note that the schedule is subject to change depending on the pace of the course.

## Academic Honor Code

All students in attendance at The University of Alabama are expected to be honorable and observe standards of conduct appropriate to a community of scholars. The University of Alabama expects from its students a higher standard of conduct than the minimum required to avoid discipline. At the beginning of each semester and on tests and projects, at the discretion of the course instructor, each student will be expected to sign an Honor Pledge.

The Academic Honor Pledge reads as follows: I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary procedures that will result from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University.

## Disability Statement

If you are registered with the Office of Disability Services, please make an appointment with me as soon as possible to discuss any course accommodations that may be necessary. If you have a disability, but have not contacted the Office of Disability Services, please call (205) 348-4285 or visit 133-B Martha Parham Hall East to register for services. Students who may need course

adaptations because of a disability are welcome to make an appointment to see me during office hours. Students with disabilities must be registered with the Office of Disability Services, 133-B Martha Parham Hall East, before receiving academic adjustments.

### Severe Weather Protocol

In the case of a tornado warning (tornado has been sighted or detected by radar, sirens activated), all university activities are automatically suspended, including all classes and laboratories. If you are in a building, please move immediately to the lowest level and toward the center of the building away from windows (interior classrooms, offices, or corridors) and remain there until the tornado warning has expired. Classes in session when the tornado warning is issued can resume immediately after the warning has expired at the discretion of the instructor. Classes that have not yet begun will resume 30 minutes after the tornado warning has expired provided at least half of the class period remains.

UA is a residential campus with many students living on or near campus. In general classes will remain in session until the National Weather Service issues safety warnings for the city of Tuscaloosa. Clearly, some students and faculty commute from adjacent counties. These counties may experience weather related problems not encountered in Tuscaloosa. Individuals should follow the advice of the National Weather Service for that area taking the necessary precautions to ensure personal safety. Whenever the National Weather Service and the Emergency Management Agency issue a warning, people in the path of the storm (tornado or severe thunderstorm) should take immediate lifesaving actions.

When West Alabama is under a severe weather advisory, conditions can change rapidly. It is imperative to get to where you can receive information from the National Weather Service and to follow the instructions provided. Personal safety should dictate the actions that faculty, staff and students take. The Office of Public Relations will disseminate the latest information regarding conditions on campus in the following ways:

- Weather advisory posted on the UA homepage
- Weather advisory sent out through Connect-ED--faculty, staff and students (sign up at myBama)
- Weather advisory broadcast over WVUA at 90.7 FM
- Weather advisory broadcast over Alabama Public Radio (WUAL) at 91.5 FM
- Weather advisories are broadcast via WUOA/WVUA-TV, which can be viewed across Central Alabama. Also, visit [wvuatv.com](http://wvuatv.com) for up-to-the-minute weather information. A mobile Web site is also available for your convenience.

### Make-up final exams

If a legitimate conflict exists, you may request a make-up exam from the instructor. If you choose to request a make-up exam for this course, you must do so (in writing) before the drop deadline. It is the student's responsibility to learn from the instructor if the request has been approved. Only students who are approved may take a make-up final exam. Students who have not requested a make-up exam in this course by the drop deadline will be required to resolve conflicting exams with the instructor in one of their other courses.

## UAct:

The University of Alabama is committed to an ethical, inclusive community defined by respect and civility. The UAct website ([www.ua.edu/uact](http://www.ua.edu/uact)) provides extensive information on how to report or obtain assistance with a variety of issues, including issues related to dating violence, domestic violence, stalking, sexual assault, sexual violence or other Title IX violations, illegal discrimination, harassment, child abuse or neglect, hazing, threat assessment, retaliation, and ethical violations or fraud.

## Generative AI Tools

All submitted work must be produced by the students themselves, whether individually or collaboratively. Use of a generative AI tools such as ChatGPT to complete an assignment constitutes academic misconduct.

## Statement on COVID-19

All University faculty, staff, and students are expected to maintain a commitment to the health and safety of our campus community. Due to the current COVID-19 pandemic, specific health and safety standards are in place to minimize exposure and community spread on campus. In the interest of your health and safety and that of all UA students, faculty and staff, the University reserves the right to change the mode of instruction or schedule of instruction at any time, based upon prevailing public health and other guidance. While the method of delivery may change, educational instruction and opportunities will continue. As such, the University will not provide a refund of tuition, in whole or in-part, based on any such changes. Detailed information on changes in format or schedule can be found at [studentaccounts.ua.edu](http://studentaccounts.ua.edu) and [financialaid.ua.edu](http://financialaid.ua.edu).

Getting vaccinated is the best way to Protect Our Herd. COVID-19 vaccines are being administered by the University Medical Center, the Student Health Center and various businesses and healthcare providers.