

# **ECON 475 B3: Economic Forecasting**

University of Illinois at Urbana-Champaign  
College of Liberal Arts & Sciences  
Department of Economics

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**Spring 2022**  
**12:30 pm to 1:50 pm Tuesdays &**  
**Thursdays**

**Course website:** Illinois Compass 2G (<https://compass2g.illinois.edu/>). **All** course material will be made available there, including class slides, homeworks and links.

**Office Hours:** Fridays 9:00 am – 12:00 pm. DKH Room 7 at the basement.

## **Course Description**

Overview of modern, quantitative, statistical and econometric methods for forecasting and evaluating forecasts. Topics include review of statistics and probability concepts; linear regressions; modeling and forecasting trends and seasonality; characterizing and forecasting cycles; moving averages, autoregressions and ARMA models; forecasting with regressions; evaluating and combining forecasts. Advanced topics includes unit roots processes, structural breaks, stochastic volatility and joint forecasting using vectorial autoregressions. Advanced topics will be covered as time permits !

Credits: 3 hours (Undergraduate)

Prerequisites: Students are assumed to have taken ECON202, ECON203 (Economic Statistics 1 and 2) or equivalent statistics and econometrics courses. Knowledge about basic calculus and linear algebra is also required.

## **Course Format**

The instructor will give lectures on major concepts and issues and have classroom discussions when necessary. Students will be asked to do problem sets and produce forecasts using the tools taught in class.

## **Course Objectives**

- Provide basic understanding of commonly used forecasting methods.
- Deliver hands-on experiences of economic forecasting using real data.

## Learning Resources

- Main Textbook: Diebold, *Forecasting in Economics, Business, Finance and Beyond*. Diebold, *Elements of Forecasting*. (2017 edition). Free access at <http://www.ssc.upenn.edu/~fdiebold/Textbooks.html> (book link under the forecasting session).
- Software: *Eviews* will be taught and used throughout the course to do forecasting of real and simulated data. Download the free version at <https://www.eviews.com/EViews10/EViews10Univ/evuniv10.html>. *Eviews* is easy to learn, practical to use and has most of the tools needed in the scope of this course. Students, for a number of reasons, may prefer to use another software. They are free to do so.
- Support Textbooks: Casella and Berger, *Statistical Inference* (2<sup>nd</sup> Edition). Granger, *Handbook of Economic Forecasting Volume 1*. Elliot and Timmerman, *Handbook of Economic Forecasting Volume 2A*. Hansen, *Econometrics* (2017 Edition) available here (<https://www.ssc.wisc.edu/~bhansen/econometrics/>).

## Student Assessment

	Score per Assignment	Quantity of Assignments	Total
Homework	4	5	20
Midterms	20	2	40
Final Examination	40	1	40

Grade	After-Curve Score
A+	[95 – 100]
A	[90 – 95)
A-	[85 – 90)
B+	[80 – 85)
B	[75 – 80)
B-	[70-75)
C+	[65-70)
C	[60-65)
D+	[50-60)
D	[0-50)

- **Homework Policies:** There will be *five* homeworks, roughly one every two weeks except on exam dates and breaks. All homeworks are to be turned in at the beginning of the class in which they are due, unless stated otherwise by the instructor.

- **Midterm and Final Exam Policies:** There will be two midterm exams and one final exam. All exams are comprehensive but will feature more recent material predominantly. They will all be open book and require the usage of software. Students are allowed to consult the textbook, class notes, personal notes, statistical software and software documentation. *They are not allowed to contact other students.*
- Exam dates and times are **not** flexible. The only exception to this rule is a death in the family or illness requiring immediate attention from a physician. See Article 1 - Student Rights and Responsibilities (for more details on these issues at: <https://studentcode.illinois.edu/article1/> ). The final exam conflict policy of the University will be enforced. The University's final exam policy is available at: <https://studentcode.illinois.edu/article3/part2/3-201/> .

## Topics

- **Part 1: Introduction and Review**
  1. Forecasting and its Approaches
  2. Refresher course in Probability and Statistics
  3. Refresher Course in Regression Analysis
  4. The Building Blocks: Information Sets and Forecasting Statements
  5. Deterministic Trends and Seasonality
  6. Economic Cycles
  7. Time-Series Moments: autocovariance, autocorrelation and partial autocorrelation function.
  8. Serial Correlation Tests
- **Part 2: Forecasting using ARMA Models**
  1. Stochastic Process: Random Walk
  2. Moving Average
  3. Wold Decomposition Theorem
  4. Autoregressions
  5. ARMA(p,q) Model
  6. Putting it All Together: Trend + Season + ARMA
  7. Forecasting Evaluation
- **Part 3: Advanced Topics**
  1. Unit Roots and Random Walks Process
  2. ARIMA Models
  3. Structural Breaks
  4. Stochastic Volatility: GARCH Models
  5. Joint Forecasting: VAR Models

## Tentative Class Schedule

<b>Week</b>	<b>Topic</b>
1	Class Overview.
1	Intro to Forecasting
2	Refresher Course: General Statistics
2	Refresher Course: Regression Analysis
3	Information Sets and Forecasting Statements
3	Forecasting with Trends
4	Model Selection
4	Eviews Workshop I
5	Seasonality
5	Joint Estimation
6	Economic Cycles
6	Time-Series Moments (ACF, etc)
7	Eviews Workshop II
7	<b>Midterm 1</b>
8	Spring Break
8	Spring Break
9	White Noise and Moving Average Process
9	Autoregressive Process
10	ARMA (part 1)
10	ARMA (part 2)
11	ARMA (part 3)
11	Forecasting Evaluation
12	<b>Midterm 2</b>
12	Unit Roots
13	ARIMA
13	Structural Breaks
14	Stochastic Volatility (part 1)
14	Stochastic Volatility (part 2)
15	Vectorial Autoregression (part 1)
15	Vectorial Autoregression (part 2)
	<b>Final Examination</b>

## Emergency Response Recommendations:

The university maintains guidelines for emergency responses. A list of recommendations when to evacuate and when to find shelter are available at:

[http://illinois.edu/cms/2251/general\\_emergency\\_response\\_recommendations\\_8\\_16\\_13\\_final.docx](http://illinois.edu/cms/2251/general_emergency_response_recommendations_8_16_13_final.docx)

Floor plans for specific buildings are available at:

<http://police.illinois.edu/emergencyplanning/floorplans/>

**Statement on Accommodations:**

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak Street, Champaign, call 333-4603 (V/TTY), or email a message to [disability@uiuc.edu](mailto:disability@uiuc.edu).

**Academic Integrity:**

“The University has the responsibility for maintaining academic integrity so as to protect the quality of education and research on our campus and to protect those who depend upon our integrity.

*Expectations of Students.* It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions. Students have been given notice of this Part by virtue of its publication. Regardless of whether a student has actually read this Part, a student is charged with knowledge of it. Ignorance is not a defense.”

The University’s full academic integrity policy is available at:

<https://studentcode.illinois.edu/article1/part4/1-401/>