![MSU Texas logo]

Dillard College of Business Administration

Syllabus: Data Modelling and Forecasting
ECON 5143-X10
Fall 2024

Contact Information:

Instructor: Dr. Pablo A. Garcia-Fuentes
Office: Dillard Building 292
Office Hours: Monday and Wednesday 8:30 am to 10:00 am, and Tuesday 8:30 am to 10:30 am.
Also, by appointment (You are welcome to stop by at any time). We can also meet on Zoom at
ZoomMeeting
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Instructor self-introduction

Dr. Garcia-Fuentes is a native of Nicaragua, Central America. He received his Ph.D. in agricultural economics from Louisiana State University in 2009, his M.S. in agricultural economics from North Carolina Agricultural and Technical State University in 1997, and his B.S. in agronomy from the Universidad Nacional Agraria, Nicaragua in 1992. He taught economic courses from 2010-2012 at Southeastern State University in Hammond, LA. He taught a graduate course in international agricultural trade in the spring of 2013 at LSU. He has been teaching economic courses at Midwestern State University since the fall 2014. He represents the college of business on the EURECA committee and is the sponsor of the Financial Management Association. He has mentored several EURECA research projects and has been organizing the DCOBA forecast competition. He has been conducting research on issues of economic growth and development, exchange rate, price analysis, remittances, and foreign direct investment. He is pleased to be your instructor of intermediate microeconomics, and he thanks you for taking this class.

Welcome:

Welcome to ECON 5143. It is a graduate course. MBA students are no longer undergraduate students. MBA students are treated as managers who are critical thinkers and problem solvers.

Text:

Hyndman, R.J., and Athanasopoulos, G. 2021. *Forecasting: Principles and practice*. 3rd edition. OTexts: Melbourne, Australia. OTexts.com/fpp3. (Required). The book is free online and can be accessed at [Textbook](#).

Supplemental Texts:

Wickhman, H. and Grolemund. 2017. G. *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. 1st Edition. O'Reilly: California, USA. The book is free online and can be accessed at [Rfordatascience](#).

Wickman, H., Navarro, D., and Pedersen, T. Nodate. *Ggplot2: Elegant graphics for data analysis*. 3rd edition. Springer. The book is free online and can be accessed at [Ggplot2](#).

The supplemental texts focus on R programming. The books are great references for learning about R coding. They help students understand the R coding we will use in this course.

Software:

This course requires students to use R. The instructions on how to download R and install it in your computer are in the Appendix of the textbook, which can be accessed at [AppendixUsingR](#). Download and install R and RStudio. We will use RStudio.

Learning R:

The course introduces students to using R. The supplemental texts explain the R code used in this course. One way to learn R programming is to run the chapters' programs, use the supplemental texts as reference, ask questions to the instructor, and invest enough time on it. The ideal scenario would be to take an R programming class first and then take this class, but there is no time for this. Therefore, students must invest enough time into learning R programming.

Computer operating system:

The instructor uses the Microsoft computer operating system. Students are responsible for submitting assignment documents/files that can be managed with the Microsoft operating system. The instructor will not be able to help students who own Mac computers due to different computer operating systems. I recommend you use a Microsoft operating system computer.

Copyright:

The class materials associated with this course are provided to facilitate student learning and are protected by the United States copyright laws. Dissemination or sale of the class material (including the World Wide Web) is not permitted. The class material is only available to students enrolled in the course that requires the use of the corresponding textbook. Students should abide

by these restrictions. The publisher of the textbook owns the copyright for the class materials associated with this course.

Course Description:

This course gives students an introduction to forecasting methods using R. It helps students learn about graphing time series, time series decomposition, time series features, using forecasting tools, time series regression models, exponential smoothing, ARIMA models, dynamic regression models, forecasting hierarchical and grouped time series, advanced forecasting methods, and practical forecasting issues. In addition, this course requires students to use R to solve problems. It would be ideal to have a class that teaches R programming, but this is not possible due to the MBA program structure. This class is not required to teach R programing; however, the instructor will be pleased to help students with learning R.

Suggestions to students:

ECON 5143 is a graduate course, which is a higher-level course and very different from undergraduate courses. To be successful in this class, students must spare at least two days a week to read the class materials, run and understand the chapter R-program, and do the homework. This is one of the toughest classes in your program. However, the instructor will be pleased to help you with any questions you may have. Do not hesitate to contact the instructor if you need help, Dr. Garcia-Fuentes's goal is to help students be successful.

Course Prerequisites:

Consent of the graduate coordinator.

Learning Goals:

The general objective of this course is to help students learn about modelling time series data and forecasting.

A. General Learning Goals:

1. Leadership. By engaging students in the analysis of time series data and forecasting, this course aims to contribute to developing students' ability to make more effective business decisions.
2. Critical Thinking. The students will demonstrate their critical thinking abilities by conducting analysis of time series data.
3. Communication skills. By engaging students in the analysis of time series data, this course aims to contribute to developing students' ability to communicate their analyses in a professional manner.
4. Integrate knowledge across business disciplines. By engaging students in the analysis of time series data, this course aims to contribute to developing students' ability to integrate data modelling and forecasting methods with other business disciplines.

5. Personal Responsibilities. The students will demonstrate their abilities in connecting choices, actions, and consequences that are related to economic reasoning and ethical decision-making when conducting analysis of time series data.

These general learning goals either represent or are related to those established by the Dillard College of Business Administration. The learning goals represent the skills that graduates will carry with them into their careers. While assessing student performance in obtaining these general learning goals, the College seeks to assess its programs. The assessments will assist us to improve our curriculum and curriculum delivery.

B. Course Specific Learning Goals:

- Learn about graphing time series data.
- Learn about time series decomposition.
- Learn about time series features.
- Learn about forecasting tools.
- Learn about time series regression models.
- Learn about exponential smoothing.
- Learn about exponential smoothing.
- Learn about ARIMA models.
- Learn about dynamic regression models.
- Learn about forecasting hierarchical and grouped time series.
- Learn about advanced forecasting methods.
- Learn about practical forecasting issues.
- Learn about R programing and applications to data modelling and forecasting.

Teaching Method:

Given that this is an online course, the course starts on 08/26/2024 and ends on 12/14/2024, as suggested by the 2024-25 academic calendar. The student must read a chapter a week as shown in the course outline below, run and understand the chapter R-program, and submit an assignment a week on D2L. The student is responsible for reading each assigned chapter and any additional class material. Class materials will be posted on D2L. The student can ask questions on any point that is not understood. The instructor has academic freedom to bring in class material and technology in his own way. In this class, you will use the internet to access the class materials posted on D2L. The week starts on Monday and ends on Sunday.

Course Policies:

A. Attendance Policy:

Attendance will be checked each week based on assignment submissions and on student access to the course on D2L. Students are expected to submit all assignments (attend all scheduled classes) for this course given the university attendance policy. Missing 2-chapter assignments from 08/26/2024 to 11/25/2024 is considered excessive by the instructor; therefore, students who

reach this level of missed classes will be dropped by the instructor with a grade of "F", given the university attendance policy. Additionally, missing 2-chapter assignments during the semester is also excessive; therefore, students who reach this level of missed assignments will get a final grade of "F", given the university attendance policy, as shown in the Student Handbook and Activities Calendar which may be found at Handbook.

B. Other Related Policies

Graduate Course:

Econ 5143 is a graduate course and students are treated as graduate students and managers. This is different from being an undergraduate student. Therefore, students should comply with the course policies.

Academic Integrity:

Regarding academic honesty, students are referred to the "Student Honor Creed" (See the Student Handbook).

ChatGPT is prohibited in this class. Assignments and exams' submissions that use ChatGPT will receive zero credits.

Exam Policies:

Exam policies are related to academic integrity and can also be stated on the first page of the test.

Americans with Disability Act:

This class follows the guidelines suggested by the Center for Counseling and Disabilities Services for those students who qualify for disability services. Please notify the instructor of your special needs during the first week of classes (See the section on "Disability Support Services" in the Student Handbook).

Syllabus Change Policy:

- This syllabus is a guide for the course and is subject to change.

Correspondence:

All correspondence regarding class issues must be conducted in person or by email using your Midwestern State University (MSU) email only. I will not return answers to questions to other email accounts. Grades will be posted on D2L and on MSU Banner. I will not discuss grades or class standing over the phone or by emails. Since email is often the most convenient means of communication, it is recommended that students use and regularly monitor their MSU email account. Grades will not be transmitted electronically (e.g., emails).

I suggest that you link your D2L email with your MSU email, so the messages sent through D2L will be forwarded to your MSU email. To do this,

- Log in to D2L.
- Click on your name on the right upper corner of the screen.
- Click on "account settings".
- Click on "email".
- Check "Forwarding incoming messages to an alternate email account" and enter your email in the box.
- Click on "save and close".

Netiquette: Communication Courtesy Code:

Students are expected to follow rules of common courtesy in all email messages, class discussions, lecture hall posts, chats, etc. If I consider any of them to be inappropriate or offensive, I will forward the message to the Chair of the department and the online administrators and appropriate actions will be taken.

Deadlines:

We cannot totally rely on cyberspace—emails get lost, and servers disconnect temporarily. Do not wait for the last hour to do your homework. Reply and check for replies on every email sent and received. The student is responsible for checking deadlines on D2L and for submitting the work to the instructor on time. *I will not reply to emails regarding homework issues during the last 7 hours prior to the deadline.*

Proctoring of exams

Because this class can use online proctoring such as ProtorU or a similar software, students will be required to pay the proctoring fees when taking the exams. In addition, because this is an online course, students are required to have a webcam.

Webcams

This course requires students to have access to a web cam.

Exams, Coursework and Grades

Exams: During the semester, there will be a midterm exam and a comprehensive final exam (200 points each). The exams can be take-home exams. The two-exam scores will be for 400 points or 66.7% of your course grade. The exam's instructions and policies will be stated on the first page of the exam. The instructor has academic freedom to include any type of question in the exams.

If a student misses an exam without prior approval from the instructor, please do not expect a make-up exam. With the instructor's prior approval, you may take a make-up exam during the week of finals. If you anticipate a valid reason for missing an exam, please inform the instructor in advance by email. An unexcused absence from an exam will result in a score of zero on that

exam and may be compensated for by counting your final exam in its place with the instructor's approval, and a 20% penalty on that exam's score will be assessed. The exam dates are noted in the Tentative Course Schedule in this syllabus. Any changes to those dates will be announced as soon as possible and posted prominently on D2L.

Assignments: There will be 11 assignments corresponding to the chapters that will be covered during the semester. The assignments will be submitted through D2L. The instructor has academic freedom to include any type of question in the assignments. There will be no make-up assignments under any circumstances. The student is responsible for having an appropriate internet connection. If you do not have an appropriate internet connection and fail to submit an assignment, do not expect a make-up assignment. You are expected to complete each assignment by the deadline. You will have an adequate amount of time for each assignment, and you must not fall behind. If you miss an assignment, you will earn zero credits. Your score for all assignments will be 190 points. In addition, students are required to attend a live SAS Institute webinar on any business analytics topic at SASwebinar.

Grades will not be transmitted electronically (e.g., emails). Grades will be posted on D2L and on MSU Banner.

Course Grade:

Course work	NA	Grade Scale	Percentages[2]	NA
SAS webinar[1]	10 pts	540-600 pts	90% & above	A
Assignments (11)	190 pts	480-539 pts	80%-89%	B
Exam 1	200 pts	420-479 pts	70%-79%	C
Exam 2/Course project	200 pts	360-419 pts	60%-69%	D
Total	600 pts	below 360 pts	below 60%	F
NA	NA	NA	NA	NA

Notes: 1. To earn the points, students must submit screenshots on D2L that show the start and end times of the webinar. 2. Percentages are only given for relative levels. Your final score is a total of all your exam, quiz, and homework scores with any bonus points added separately. Therefore 89% is not 1 point short of an A. 89% is only 534 points, which is 6 points short of an A.

Senate Bill 11

Senate Bill 11 passed by the 84th Texas Legislature allows licensed handgun holders to carry concealed handguns on campus, effective August 1, 2016. Areas excluded from concealed carry are appropriately marked, in accordance with state law. For more information regarding campus carry, please refer to the University's webpage at campus handgun policy.

Outline of the course

ECON 5143-X10
Fall 2024
(Subject to changes and additional readings)

Week and dates	Chapter	Topic
Week 1 (Aug 26, Sep 1)	3*	Syllabus and D2L; Data visualization
Week 2 (Sep 2, 8)	NA	Holiday; Run R to get familiar with it
Week 3 (Sep 9, 15)	2	Time series graphics
Week 4 (Sep 16, 22)	3	Time series decomposition
Week 5 (Sep 23, 29)	4	Time series features
Week 6 (Sep 30, Oct 6)	5	Forecaster's toolbox
Week 7 (Oct 7, 13)	7	Time series regression models
Week 8 (Oct 14, 20)	8, Exam 1	Exponential smoothing; Exam 1: chapters 2, 3, 4, 5, and 7, Due on 10/21/2024
Week 9 (Oct 21, 27)	9	Arima Models
Week 10 (Oct 28, Nov 3)	10	Dynamic regression models
Week 11 (Nov 4, 10)	11	Forecasting hierarchical and grouped time series
Week 12 (Nov 11, 17)	12	Advanced forecasting methods
Week 13 (Nov 18, 24)	12	Advanced forecasting methods; Thanksgiving Holiday (11/27-12/1).
Nov 25, 2024	NA	Last day for "W" at 4:00pm. Drops after this deadline receive an "F"
Week 14 (Nov 25, Dec 1)	13	Practical forecasting issues
Week 15 (Dec 2, 9)	13	Practical forecasting issues
Week 16	Final exam	Monday, Dec 9, 2024, 11:59pm

Notes: The instructor can change the exam dates and locations if it is necessary. Chapter 3* is chapter 3 from "Wickhman, H. and Grolemund. 2017. G. *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. 1st Edition. California: O'Reilly Media, Inc."