

University of Florida
Department of Economics
Spring 2023

**Economic Analysis of Data
ECO3430**

Instructor:	Ignacia Mercadal	Time:	M&W 9:35 – 11:30
Email:	imercadal@ufl.edu	Classroom:	MAT 16
Office Hours:	Wednesdays 1:00–3:00	Sign up for an appointment here	
TA:	Christopher Browy	TA email:	cbrowy@ufl.edu
TA OH:	Tuesday 3:00-5:00		

Course Description and Objective

This is a course on economic data analysis using R. We will first learn to explore and visualize data. Then we will move to tools commonly used to find relationships between variables, where we will discuss the challenges arising when we try to establish causal relationships from observational data and how to address them. By the end of this class, you are expected to be able to explore and describe a data set using R, and think critically about when certain tools are able to separate correlation and causality in concrete examples. To put these skills into practice, students will work on a group research project in which they will pose a policy relevant question and work on answering using publicly available data.

Prerequisites

Principles of Microeconomics (ECO 2013), *Principles of Macroeconomics* (ECO 2023), and *Introduction to Statistics I* (STA 2023) or equivalent introductory statistics class. Students are expected to have **basic knowledge of statistics and multivariate calculus**. Please contact me if you are interested in the class and want to discuss whether you have the background to take this class. **Knowledge of R is not required.**

Course Website

All information about the course will be posted on Canvas. Students are expected to check it **daily**. All assignments must be submitted through Canvas.

Textbooks and Readings

The recommended textbooks for this class are:

- Joshua D Angrist and Jörn-Steffen Pischke. *Mastering 'Metrics: The Path from Cause to Effect*. Princeton University Press, 2014.
- James H Stock and Mark W Watson. *Introduction to econometrics* 4th ed, 2018.
- Chester Ismay and Albert Young-Sun Kim. *Statistical Inference Via Data Science : A ModernDive into R and the Tidyverse*. 2020. Available [here](#).
- Guido W Imbens and Donald B Rubin. *Causal Inference in Statistics, Social, and Biomedical Sciences*. Cambridge University Press, 2015. Available only through the library.
- Bruce Hansen's "Introduction to Econometrics".
- Florian Oswald, Vincent Viers, Pierre Villedieu, and Gustave Kennedy. *Introduction to Econometrics with R*. SciencesPo Department of Economics, Paris, France, 2020. URL <https://scpoecon.github.io/ScPoEconometrics/>

The textbooks are mostly for reference since the class will be fast paced. I will point out to the specific sections as necessary. Please send me an email if you want more guidance on how to use the books. A large portion of the slides is based on those by [Oswald et al. \[2020\]](#).

Communication

Please use your UF email, check your email daily, and expect emails to be answered within 24 hours. Please follow basic rules for professional correspondence when writing course related emails. You can find some basics [here](#). If you have doubts, please ask me.

Grading

- 10% of your grade will be based on participation, completion of DataCamp assignments, and performance in in-class labs.
- 20% of your grade will be performance on the best 5 out of 6 problem sets.
- 45% of your grade will be performance on the three exams (15% each).
- 25% of your grade will be a group project.

Regrade Requests

Regrade requests must be typed and submitted in writing **within a week of receiving your graded problem set or exam back**. You must state the exact reason for a regrade, either due to a miscalculation adding the points or an alternative but valid solution. “I think I deserve more points for this answer” is not an acceptable request and will not be considered. The whole assignment will be regraded, which means that *your grade can increase or decrease*.

Grading will be according to the following scheme:

Score	Grade
94 - 100	A
90 - 93	A-
87 - 89	B+
83 - 86	B
80 - 82	B-
77 - 79	C+
73 - 76	C
70 - 72	C-
67 - 69	D +
64 - 66	D
61 - 63	D-
0 - 60	E

The above grading policies are consistent with UF policies regarding grade determination. This information can be found [here](#).

Make-up exams will be arranged only for absences that are explicitly covered by the [UF Attendance Policy](#). Whenever possible, you should reach out at least ten business days in advance to arrange a make-up exam. Of course, this will not always be possible. Unforeseen absences and emergencies occur and can be excused without such advance notice. In most cases, you will be asked to provide evidence or documentation of an absence that is explicitly excused by the [UF Attendance Policy](#). Absences related to religious holidays and worship do not require this documentation.

Problem Sets

There will be six individual problem sets during the semester. You can work in groups, but each student will write and submit an individual solution (written independently). Problem sets will be submitted as an RMarkdown knitted into pdf or html (you will learn how to do this in this class). The code should run without issues and generate the pdf or html output. The grader will not fix code bugs.

Late assignments will not be accepted because solutions will be posted on Canvas after the deadline so you can review them. There will be no makeup assignments, but you will have some flexibility because only the best 5 out of 6 problem sets will count for your grade.

Exams

There will be three exams worth 15% each. If for **any reason** you cannot attend the first **or** the second exam, the weight will be moved to the third exam. If you take the three exams and do better in the last one, the third exam will replace the worse of the other two. I.e. the exam component of your grade is $\max\{0.15E1 + 0.15E2 + 0.15E3, 0.15E1 + 0.3E3, 0.15E2 + 0.3E3\}$. If you cannot attend an exam, please let me know as early as possible.

Labs

The last 30-45 minutes of each class will be spend working on a hands-on lab. These labs will be one of the best tools to practice and become familiar with R, since you will work on some exercises in R applying the topics discussed during the lecture to some concrete dataset. Attendance is not mandatory, but it is helpful to be in the classroom if you want to have help from the professor and TA. Labs are expected to be submitted during the class by the student who is up to date with class contents, but can be submitted until midnight of the same day. To give you some flexibility, the worst 5 labs (including missing) are dropped to compute your final grade.

Group Project

You will work in groups of 2-3 students on a project. The goal will be to answer a policy relevant question using a publicly available dataset and analyzing it using R and Rstudio. I will guide you throughout the semester answering questions during office hours and giving you feedback on your intermediate deliveries. All submissions are expected to be submitted in RMarkdown and submitted to Canvas. Please pay attention to proper formatting of the knitted file. Relevant dates (details on each assignment will be posted on Canvas):

- **January 25:** Submit groups if you have a preference (send an email to Professor Mercadal). Those who do not send their preferences will be assigned a group at random, so everyone will know in which group they are in by January 27.
- **February 17:** Identify question and data, timeline, and plan on team roles.
- **March 31:** Descriptive analysis and potential confounding factors.
- **April 21:** Main analysis and results.
- **April 24 and 26:** In-class presentations.
- **May 5:** Final version.

Together with the final version, you will submit a 1 page summary of your contribution to the team, as well as a description of the contribution of the other members, and how well you worked as a team. Some good practices to work better as a group:

- Respond to emails within 24 hours.
- Arrive to meetings on time and prepared.
- Listen to others, and respond to comments with respect and honesty.
- Do your share.
- Do not underestimate the amount of time needed to complete each task.
- Any others on which you decide to agree.

Learning R

This is a hands-on class in which we will use R to analyze data throughout the semester. You will learn R primarily from practicing on your own, which is the only way to really learn. To help in this process, the final part of each class will be a lab in which you will work individually but will be able to ask questions to the professor. For this, you should bring your laptop every class.

Here are some resources that you might find useful. I encourage you to explore them independently:

- Google: “do X in R”. Try variations of X until you find an answer. You will find many answers on <https://stackoverflow.com/>.
- Hadley Wickham and Garret Golemund, *R for Data Science*. Available [here](#)
- **Datacamp**: An online resource to learn R and data science in general. You will have unlimited access during this semester. For this, sign up using [this link](#). The first assignments to get you started in R are from Datacamp.
- R Markdown resources: <https://rmarkdown.rstudio.com>

Cheating and Plagiarism:

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to

the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”” The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. You should familiarize yourself with the [Student Honor Code and Student Conduct Code](#). Cheating and plagiarism are not the only violations of this policy. Importantly, ignorance of a policy is not a valid reason for violating it. If you have any questions or concerns, please consult with the instructor or TA.

Disability Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should register with the [Disability Resource Center](#). Once registered, students will receive an accommodation letter that can be presented to the instructor when requesting accommodations. Please register at the beginning of the course if seeking accommodations. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Class Content

1. Introduction to R. Quick review of statistics.
 - *Mastering Metrics*, Introduction
 - R and Rstudio installation and basics
 - Stock and Watson, Ch.1, 2, 3
2. Data Description and Visualization
 - *Modern Dive*, Chapters 2, 3, 4
3. Simple Linear Regression
 - Stock and Watson, Ch.4
 - *Modern Dive* Ch. 5
4. Multiple Linear Regression
 - Stock and Watson, Ch.5
 - *Mastering Metrics* Ch. 2,6
 - *Modern Dive*, Ch.6, 7, 8, 9, 10
5. Nonlinear Regression Models
 - Stock and Watson, Ch.6
6. Introduction to Causality
 - *Mastering Metrics* Ch.1
 - Stock and Watson, Ch.7, 11
7. Panel Data and Differences-in-Differences
 - *Mastering Metrics*, Ch. 5
 - Stock and Watson, Ch. 8
8. Topics: IV or RDD (time dependent)
 - *Mastering Metrics*, Ch. 3, 4
 - Stock and Watson, Ch. 10,11

Tentative Course Schedule

MONDAY	WEDNESDAY	FRIDAY
<div style="border: 1px solid black; display: inline-block; padding: 2px;">1/ 9</div> Create Datacamp account Syllabus and R	1/11 Lab 1 Bring laptop. Intro to R and Rstudio.	1/13 Datacamp Due
1/16 Martin Luther King Day	1/18 Lab 2 Visualization	1/20 Datacamp Due
1/23 Lab 3 Visualization	1/25 1pm Group members due Lab 4 Review of Statistics	1/27 Datacamp Due Problem Set 1
1/30 Lab 5 Review of Statistics	<div style="border: 1px solid black; display: inline-block; padding: 2px;">2/ 1</div> Lab 6 Simple Regression	2/3
2/6 Lab 7 Simple Regression	2/8 Lab 8 Multiple Regression	2/10 Problem Set 2
2/13 Review Session	2/15 First Exam	2/17 Project Part 1
2/20 Lab 9 Multiple Regression	2/22 Lab 10 Multiple Regression	2/24 Problem Set 3
2/27 Lab 11 Nonlinear Regression Models	<div style="border: 1px solid black; display: inline-block; padding: 2px;">3/ 1</div> Lab 12 Nonlinear Regression Models	3/3
3/6 Lab 13 Causality	3/8 Lab 14 Causality	3/10 Problem Set 4

MONDAY	WEDNESDAY	FRIDAY
3/13 Spring Break	3/15 Spring Break	3/17 Spring Break
3/20 Lab 15 Review / Catch up class	3/22 Review Session	3/24 Problem Set 5
3/27 Second Exam	3/29 Lab 16 Panel Data	3/31 Project Part 2
4/ 3 Lab 17 Panel Data	4/5 Lab 18 IV	4/7
4/10 Lab 19 IV	4/12 Lab 20 RDD	4/14 Problem Set 6
4/17 Review Session	4/19 Third Exam	4/21 Project Part 3
4/24 Student Presentations	4/26 Student Presentations	4/28
5/ 1	5/3	5/5 Project - Final Version

Student Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available [here](#). Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.

Health Counseling and Emergencies

- **U Matter, We Care:** If you or a friend is in distress, please contact umat-ter@ufl.edu or 352-392-1575 so they can reach out and help.
- **Counseling and Wellness Center:** Reach by phone at 352-392-1575, and the University Police Department: 392-1111 or 9-1-1 for emergencies.
- **Sexual Assault Recovery Services (SARS):** UFPD **Office of Victim Services** (confidential) (352) 392-5648, Student Health Care Center, 352-392-1161.
- **University Police Department** at 352-392-1111 (or 9-1-1 for emergencies).

Class Recordings

Please be aware of UF's policy on class recordings:

“Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.”