

# ECON400 - Syllabus

University of North Carolina, Chapel Hill, Summer II, 2024

Last update: June 21, 2024

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| → <b>Instructor:</b> Daniel Coutinho                                 | → <b>Recitations:</b> Mondays and Wednesday,<br>11:45am - 1:00 pm |
| → <b>Email:</b> <a href="mailto:dancout@unc.edu">dancout@unc.edu</a> | → <b>Office Hours:</b> Thursday, 16:00-17:00                      |
| → <b>Classes:</b> Every day, 9:45am - 11:15am                        | → <b>Room:</b> Peabody Hall, Rm 2024                              |

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## Course Description

This course is a comprehensive introduction to statistics, including descriptive statistics and statistical graphics, probability theory, distributions, parameter estimation, hypothesis testing, simple and multiple regression, and use of statistical software. This course includes a substantial introduction to basic econometrics.

**Prerequisites:** ECON 101 and one of MATH 152, MATH 231, STOR 112, STOR 113

## Learning Objectives

This course fulfills the Quantitative Reasoning focus capacity of the IDEAs in Action general education curriculum, which has the following learning outcomes.

1. Summarize, interpret, and present quantitative data in mathematical forms, such as graphs, diagrams, tables, or mathematical text.
2. Develop or compute representations of data using mathematical forms or equations as models, and use statistical methods to assess their validity.
3. Make and evaluate important assumptions in the estimation, modeling, and analysis of data, and recognize the limitations of the results.
4. Apply mathematical concepts, data, procedures, and solutions to make judgments and draw

More specifically: This course will provide an introduction to the ideas of probability and statistics, that are essential foundations for the methods economists use everyday when analyzing data. By the end of this course, you should be able to:

1. Know what random variables are and understand objects frequently associated with it, like cumulative distribution functions, density functions and moments
2. Be familiar with some common distributions, like the Gaussian and the Binomial distributions
3. Connect economic relevant parameters to statistical parameters
4. Understand how we can recover parameters of interest from the data
5. Understand how we can test hypothesis about parameters of interest
6. Have some familiarity with statistical software

## Materials

- **Textbook:** OpenIntro Statistics, you can get for free from <https://www.openintro.org/book/os/> I am not going to follow this too closely. However, it is a nice reference if you have any questions. There are a billion of other books dealing with probability and statistic inference, some will be listed at the reading list.
- **Software:** We will use R, and the most used IDE (Integrated Development Environment) for R is RStudio. The relevant link, with explanations of what you need to install: <https://posit.co/download/rstudio-desktop/>
- **Resources:** Not mandatory in any way. It just points out from where I got some of the ideas, books that might be helpful and so on.

## Grading

I will use the following grading scale, although I may curve numerical grades to higher letter grades at the end of the semester if needed:

A [93,100]	C [73,77)
A- [90,93)	C- [70,73)
B+ [87,90)	D+ [67,70)
B [83,87)	D [60,67)
B- [80,83)	F <60
C+ [77,80)	

## Grading Components

**Quizzes:** 30%. One per week and your lowest score will be dropped. It will cover the material we talked about during the previous week.

**Final:** 30%. Covers everything taught in the course.

**Recitation:** 20%. We will have recitation activities, and this will be graded.

**Problem Set:** 20%. This will be graded on submission: as long as you try, you will get full credits. The incentive here is that you *try to do it* (see the tips section). You are encouraged to work in groups, but each student needs to submit their own version. I will drop your lowest score here as well. **These are always due on Friday at 4pm and should be submitted on Gradescope**

## Tips

- “Mathematics is like any sport: the only way of getting good at it is playing” - Every single Math teacher I had
- Make your life easier: call me Daniel instead of using my last name. I am Brazilian and everyone calls everyone by their first name in Brazil.
- Working in groups often makes you life easier. While each student is required to submit their own work, feel free to work in groups when working the problem sets and during recitations.

## Schedule

This is tentative.

Dates	Topics	Scheduled items	Reading list
Jun 24 to Jun 28			
Mon	Introduction		Hendry (1995), Chp 1
Tues	Sets and Probability		
Wed	Sets and Probability		
Thur	Joint and Conditional Distribution		
Fri	Random Variables	PS1	
July 1 to July 5			
Mon	Random Variables	Quiz 1	
Tues	Distributions		
Wed	Distributions		
Thur	<b>No class, 4th July</b>		
Fri	Joint and Conditional Distribution	PS 2	
July 8 to July 12			
Mon	Joint and Conditional Distribution	Quiz 2	
Tues	Estimation		
Wed	Estimation		
Thur	Estimation		
Fri	Estimation	PS3	
July 15 to July 19			
Mon	Confidence Interval	Quiz 3	
Tues	Confidence Interval		
Wed	Hypothesis test		
Thur	Simple Regression		
Fri	Simple Regression	PS4	
July 22 to July 26			
Mon	Multiple Regression	Quiz 4	
Tues	Multiple Regression		
Wed	Multiple Regression		
Thur	Multiple Regression		
Fri	Regression Inference	PS5	

## Resources

Nothing here is mandatory. The ones with a \* means this is available online via the UNC library system

**TB:** OpenIntro Statistics, *you can get for free from* <https://www.openintro.org/book/os/>

**Dynamic Econometrics\*:** Hendry, David; Dynamic Econometrics, Oxford University Press, 1995.

*I will use the introduction, this book is advanced but has a very honest (and somewhat amusing) discussion of econometrics in the first chapter*

**A Modern Introduction to Probability and Statistics\*:** Dekking, F.M, Kraaikamp C., Lopushaä, H.P, Meester, L.E.; A Modern Introduction to Probability and Statistics: Understanding Why and How, Springer, 2005 *I really like this one!*

**If you are rusty in Calculus:** *I am told that Khan Academy is great* <https://www.khanacademy.org/math/calculus-1>

If you made this far: write in the top of your first assignment “Vou te contar/os olhos já não podem ver” to get an extra point.

## Syllabus Changes

The instructor reserves the right to make changes to the syllabus, including problem-set due dates and test dates. These changes will be announced as early as possible. Please note that any syllabus modifications will be carefully considered and aim to have the least disruptive impact on students. I prioritize ensuring these changes are beneficial and improve the learning experience.

## University and Course Policies

- **Honor Code Statement:** I expect all students to follow the guidelines of the UNC honor code. In particular, students are expected to refrain from “lying, cheating, or stealing” in the academic context. You can read more about the honor code at [honor.unc.edu](http://honor.unc.edu). In any course, including mine, what constitutes cheating can change from one activity to another. For example, collaboration may be encouraged for an assignment but qualify as cheating during an exam. Please see my guidelines for each activity, and if you are unsure, please ask me to clarify.
- **Attendance Policy and Approved Absences:** No right or privilege exists that permits a student to be absent from any class meetings, except for these University Approved Absences:
  1. Authorized University activities with official notification from the organization (e.g., travel letter).
  2. Disability/religious observance/pregnancy, as required by law and approved by Accessibility Resources and Service and/or the Equal Opportunity and Compliance Office (EOC)
  3. Significant health condition and/or personal/family emergency as approved by the Office of the Dean of Students, Gender Violence Service Coordinators, and/or the Equal Opportunity and Compliance Office (EOC). Please note that this may also pertain to significant health conditions, such as COVID-19 or severe flu.
- **Invalid excuses:** Anything not listed explicitly as a University Approved Absence, including but not restricted to club activities/events, interviews (unless interviewer provides documentation that the date of the interview cannot be changed), illnesses which are not severe enough to warrant hospitalization, travel and/or vacation plans, feeling unprepared, etc. Attendance is recommended. You are responsible for any announcements that you may have missed if you choose not to attend class. You should get the missed

notes/announcements from one of your peers or by watching the recorded lecture. You are not required to attend class; however, an unexcused absence during a Friday class will result in a zero for the Lecture Exercise.

- **Make-up Work with a University Approved Absence:** Students who present me with University Approved Absence documentation are eligible for makeup work. This includes documentation which comes specifically from ARS, EOC, the Office of the Dean of Students, the Gender Violence Service Coordinators or the official organization (barring club sports).
  - All other types of documentation cannot be used for University Approved Absences, and thus, makeup work cannot be given under these circumstances.
  - Documentation must specify exactly which dates the student is to be excused for; thus, a beginning and end time must be made explicit.
  - Makeup requests must be submitted prior to missing an exam if at all possible and no later than 5 days after the student has returned if there is a sudden absence.
  - If you have a university approved absence, then it is your responsibility to email me at [dancout@unc.edu](mailto:dancout@unc.edu) either before or during the week you return to let me know which assignment(s) you would like to make up. If you email more than 5 days after you return, you will be unable to make up the missed work.
  - If you miss one quiz, you can use this to be dropped out. Otherwise, I will make you a new quiz to be taken in a scheduled time that works for both of us.
- **Late Assignments:**
  - Late assignments are not accepted unless you have a University Approved Absence with one of the proper documentations as described above.
  - I will not accept an assignment past the deadline if you are having a technical problem.

## University Resources

- *Accessibility Resources and Services:* ARS ([ars@unc.edu](mailto:ars@unc.edu)) receives requests for accommodations, and through the Student and Applicant Accommodations Policy determines eligibility and identifies reasonable accommodations for students with disabilities and/or chronic medical conditions to mitigate or remove the barriers experienced in accessing University courses, programs and activities. ARS also offers its Testing Center resources to students and instructors to facilitate the implementation of testing accommodations.
- *Counseling and Psychological Services:* UNC–Chapel Hill is strongly committed to addressing the mental health needs of a diverse student body. The [Heels Care Network website](#) is a place to access the many mental health resources at Carolina. CAPS is the primary mental health provider for students, offering timely access to consultation and connection to clinically appropriate services. Go to [their website](#) or visit their facilities on the third floor of the Campus Health building for an initial evaluation to learn more. Students can also call CAPS 24/7 at 919-966-3658 for immediate assistance.
- *Title IX resources:* Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made online to the EOC or by contacting the University’s Title IX Coordinator (Elizabeth Hall, [titleix-coordinator@unc.edu](mailto:titleix-coordinator@unc.edu)) or the Report and Response Coordinators in the Equal Opportunity and Compliance Office ([reportandresponse@unc.edu](mailto:reportandresponse@unc.edu)). Confidential resources include Counseling and Psychological Services and the Gender Violence Services Coordinators ([gvsc@unc.edu](mailto:gvsc@unc.edu)). Additional resources are available at [safe.unc.edu](http://safe.unc.edu)

- **Artificial Intelligence Use Policy:** Use of generative AI tools of any kind is not permitted in this course. Any use of these tools will be considered an instance of academic dishonesty and will be referred to the Honor System.