The University of Texas at Austin
ECO 329 (Economic Statistics)/Unique Number 33955
Gordon Ji
Fall 2024
Monday & Wednesday 8:30 am to 9:45 am, WAG 101

SYLLABUS

ECO 329 is an introductory course in probability, statistics, and quantitative methods and is required of all students majoring in Economics. The focus of the course will be the development of formal mathematical models of probability and statistics to analyze economic data. In order to apply these models with simulated and real-world data, the *R* statistical programming language will be used throughout the course. Within the Economics major, ECO 329 serves as a (gateway) prerequisite for both econometrics (ECO 441K) and intermediate microeconomics (ECO 420K).

Prerequisites: Introductory economics coursework (at the level of ECO 304K and ECO 304L) and a two-semester calculus sequence (at the level of M 408K and M 408L) are the prerequisites required for ECO 329. No exceptions are made for the prerequisites.

Contact information: Please contact me by email (guozhenj@utexas.edu) with any questions about the course, including "ECO 329" at the beginning of the e-mail subject.

Teaching assistants:

Yiqun Zhao, (yiqun.zhao@utexas.edu): problem sessions (Friday 11:00 am - 12:30 pm on Zoom)

Supplemental instructors: Jocelyn Castanon (jc96792@eid.utexas.edu)

> This course is supported by Supplemental Instruction (SI) sessions. SI Sessions are led by experienced and trained students who develop engaging, structured, small-group activities for you to work through. These sessions are a consistently scheduled time for you and your classmates to tackle difficult content and learn the best approaches to the course! More information on session times and how to access them will be available on Canvas. You're welcome to attend sessions at any point in the semester but regular participation in SI Sessions has been shown to improve students' performance by an average of one-half to a full letter grade higher than the class mean. It is highly recommended for everyone.

Office hours: The teaching assistants will have problem-solving sessions every week and I will have regularly scheduled office hours. The problem-solving session will be recorded by Zoom and posted on Canvas. My office hours will be in person unless otherwise notified,

and if you have a personal issue to talk about, feel free to drop in my office to talk about it and will not be recorded or posted.

Office Hour: Wednesday 11:00 am - 12:00 pm, BRB 3.134G, hosted by Gordon Ji
Problem session: Friday 11:00 am - 12:30 pm, on Zoom (ID: 951 5635 7696), hosted by Yiqun Zhao

Textbook: The textbook for this course is a draft textbook written by Prof. Jason Abrevaya from the Econ department, who is also the professor for the other section. *Probability and Statistics for Economics and Business: An Introduction Using R*. The book is available free-of-charge as a pdf file on Canvas. A printed copy can be purchased from UT Copy Services at their GSB location (GSB 3.136) for just under $30.

> Document Solution - Graduate School of Business, GSB 3.136 100 W 21ST ST, AUSTIN, TX 78712
>
> Hours: 9 am to 4 pm M-F (closed daily from 12:30-1:30 p.m. except the first two weeks of each semester)
>
> Email: utcopy@austin.utexas.edu Phone: 512-471-8281 Fax: 512-232-7172 Services: Digital copy/printing orders, UT Line retail, self-serve computers

Course materials and lectures: All course materials will be posted to Canvas. Lectures will be based on prepared lecture notes, which will be posted to Canvas as pdf files after the class.

DataCamp: DataCamp is required for this course and will be used for learning the basics of the *R* statistical programming language. You will be able to use DataCamp this semester for free. If you have not received an e-mail invitation to join the ECO 329 (Economic Statistics) group on DataCamp or are having problems joining the group, please contact me immediately.

Homework and Quiz: Both homework and quizzes are completed on Canvas. There are no time limits on either one of them so feel free to use any resources. I encourage you to help each other with homework and quizzes, but you will have to submit work individually on Canvas. Homework is part of the learning process, while the quiz is part of the reviewing process, which is why homework is graded in a scheme like this: if your final score on Canvas >1.2, you receive 2; $[0.6, 1.2]$, receive 1.2; <0.6 you receive the points you scored. The quiz grading will be solely based on *correctness*, meaning you get what you scored on Canvas.

R and RStudio: You will be working with the *RStudio* interface to use the R statistical programming language. On Canvas, refer to the "R and RStudio" page within "Course preparation" in the "Modules" tab for detailed instructions on installing *R/RStudio* on your own computer (recommended) or using it through DataCamp. If you are unable to access a computer on which you can install R/RStudio, you may either (i) use the computer labs

in RLP (RLP 1.402 or RLP 1.404, be aware that they are sometimes reserved for classes) or (ii) sign up for a free RStudio "cloud" account at https://posit.cloud/ (but this is not an option that we can provide assistance with)

Exams: On the exams you must show your work to receive credit. You do not have to show every step, but you must show enough work for us to follow your logic. If you do not show your work, you will not get points even if your answer is correct. On the other hand, if you set up the problem correctly, and show your work, you will get most or all the points even if you make a calculation error. You will receive partial credit.

Exam dates and times. All exams will be in-person on campus. Location WAG 101 (regular classroom):

1. Midterm 1: Wed. October. 2nd (8:30 am - 9:45 am)
2. Midterm 2: Mon. November. 11th (8:30 am - 9:45 am)
3. Final: Mon. December 16, (1 pm - 3 pm)

You must be available at the times of the midterms since we will be sharing the same exam with the other section unless I received a Class Absence Notification request from the dean of the student. See Class Absence Notification Request

For students who have extended time in their accommodations letter from Services for Students with Disabilities (SSD), I will give additional time for their exams or other arrangement that we both agree on. If you require accommodation for a disability, please let me know about it as soon as possible, even if your accommodation letter from Services for Students with Disabilities (SSD) isn't ready yet. (Ultimately, I will need the letter in order to provide accommodation, however.)

Students who have an accommodation letter must send a pdf of their accommodation letter by email. I'll reply and that will initiate the discussion about how the accommodation will be provided. (We can either email or Zoom.) The notice I received from SSD that your accommodation letter is available in the portal is not sufficient. It is the student's responsibility to contact me directly; to provide a pdf of the letter; to let me know which accommodation they would like to use; and to discuss how the accommodations will be provided.

For the final exam, **only when** a university-approved absence request could allow me to arrange a makeup final exam, which typically involves an "incomplete" in the course (to give me time to write a makeup final exam and to give the student some time to recover from the absence).

Grading: Grades will be based on a combination of the following components:

Assignments	Percentage
Midterm 1	20%
Midterm 2	20%
Final Exam	25%
DataCamp Assignments	5%
Problem Sets (On Canvas)	20%
Quizzes (On Canvas)	10%
	100%

The DataCamp component will be graded entirely on completion, whereas problem sets will be graded largely on completion. It is important to participate and complete these three components both for their weight in the grade and their value in preparing for the exams.

Your course score will be computed as a weighted average, using your percentage scores on these components. After the midterm exam, approximate grading cut-offs are provided here. I reserve the right to update it after each midterm and will be communicated promptly.

Curve: It is my goal to create a positive and cooperative learning environment for the quantitative course. However, due to its quantitative nature, it is hard to not curve the grades for both midterms and finals. I will consider both the difficulty of the exam and the average performance of each exam before curving but likely I will curve the average grade of the exam to be in the B range.

Grade	**Cutoffs**
A+	99+
A	90∼<99
A-	85∼<90
B+	80∼<85
B	75∼<80
B-	70∼<75
C+	62∼<70
C	55∼<62
C-	52∼<55
D	50∼<52
F	<50

Topic coverage:
(The topics, especially the weekly schedule are subject to change.)

#	Topic	Book Chapter	Optional Book Sections	Week
0	The basics of R (no lecture notes)	1 + DataCamp		1
1	Introduction to probability theory	2		1,2
2	Conditional probability and independence	3		3
3	Combinatorics (counting methods)	4		4
4	Economic data and sampling	5		5
5	Descriptive statistics: univariate	6		6, 7
6	Descriptive statistics: bivariate	7		7, 8
7	Discrete random variables	8, 9	9.3, 9.4	8, 9
8	Continuous random variables	10	10.4.4	9, 10
9	The normal distribution	11	11.4	10, 11
10	Sampling distributions: exact	12	12.3	11, 12
11	Sampling distributions: asymptotic	13	13.3	13
12	Estimation and confidence intervals	14	14.1.3, 14.2.1, 14.3.1, 14.5	14
13	Hypothesis testing	16	16.1.2, 16.1.3, 16.2.1, 16.4	15

Note: Chapter 15 of the book ("The bootstrap") will not covered in this course.

Additional course policies:

- **Artificial intelligence (e.g. ChatGPT)**: Existing artificial intelligence tools, like ChatGPT, would almost certainly get an A in this course through their performance on the problem sets, quizzes, and exams. Unfortunately, you will not have access to AI tools during the written exams, and an over-reliance on them on the problem sets and/or quizzes will not prepare you adequately for the exams. That said, AI tools are extremely powerful in the hands of those who have a deep understanding of probability and statistics. Should you have the time and interest, I urge you to play around with AI tools to see what is possible after you complete the assigned problem sets by yourself. Time permitting, I will try to show some examples using ChatGPT in class.
- **Sharing of course materials**: Sharing of course materials is prohibited. No materials used in this class, including but not limited to lecture handouts, videos, and assessments (quizzes, exams, homework assignments), may be shared online or with anyone outside of the class unless you have my explicit written permission. The unauthorized sharing of materials promotes cheating. It is a violation of the university's Student Honor Code and an act of academic dishonesty. Any materials found online (e.g. on file-sharing sites) that are associated with you will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including a failing grade.

- **Accommodations for students with disabilities:** Students with disabilities may request academic accommodations from the Services for Students with Disabilities (SSD) (within the Division of Diversity and Community Engagement). Accommodations can only be provided with official certification from the SSD office (512-471-6259, http://diversity.utexas.edu/disability/).

- **Statement on academic dishonesty:** All of your participation and submitted work in this class is expected to be in accordance with the UT Honor Code. Students who violate the University rules on academic dishonesty are subject to disciplinary penalties, including the possibility of failure in the class and/or dismissal from the University.

  Each student in this course is expected to abide by the University of Texas Honor Code:

  > "The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community."

  The problem sets are allowed and encouraged to be completed with a group smaller or equal to 3 people. You would need to write the name of your teammates on top of your submission and submit the work individually.

- **Quantitative Reasoning Flag.** This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. Therefore, you should expect a substantial portion of your grade to come from using quantitative skills to analyze real-world problems.

- **Religious Holidays.** By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holiday. If you must miss a class, an examination, or an assignment, in order to observe a religious holiday, you will be given an opportunity to complete the missed work within a reasonable amount of time after the absence.

- **Behavior Concerns Advice Line (BCAL).** If you become worried about someone who is acting differently, you may call the Behavior Concerns Advice Line at 512-232-5050 to discuss your concerns about their behavior. This service is provided by the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP), and the University of Texas Police Department (UTPD). Visit http://www.utexas.edu/safety/bcal for more information.