University of Colorado Boulder
INTRODUCTION TO STATISTICS WITH COMPUTER APPLICATIONS
ECON 3818 SYLLABUS, SUMMER 2025

Instructor: Dr. Sara Avila

Email: **sara.avila@colorado.edu**

Zoom: https://cuboulder.zoom.us/my/saraavila

- Zoom Office Hours: Tuesdays and Thursdays 9 am -11:00 am or by appointment

INSTRUCTOR BIO

I am an economics instructor with more than two decades of experience. My research interests are in the fields of environmental economics and more recently, in how to teach economics. I have worked on topics related to air quality, climate change, urban transportation, and biodiversity conservation. I am passionate about building understanding in a diverse environment. I am also an avid (but aging) runner, so when I am not injured, I run every day.

Term Start: June 2, 2025

Term End: July 27, 2025

COURSE WEBSITE

Canvas is our class website:

- Login using your University of Colorado Boulder identikey and password https://canvas.colorado.edu/
- Under Course List, click "ECON 3818: Introduction to Statistics"
- Note: all email correspondence will be through your CU Boulder email address.
    - Do not use the Canvas email or messages, it is not checked.

COURSE DESCRIPTION

This course introduces you to the principles of statistical reasoning and inference. To this end, the ultimate goals of the course are for you to thoroughly understand the following concepts: sampling distributions, hypothesis testing, and confidence intervals across multiple settings. Organized into fourteen modules, the course is divided into four parts. The first part of the course provides an overview of how data is properly collected and how to explore data using visual and numerical methods. The second part is an introduction to probability theory, discrete and continuous probability distributions and mathematical expectation. The third part introduces sampling distributions, confidence intervals and hypothesis testing. Finally, the last section applies statistical inference to population means, to proportions and to simple regressions.

This foundational course is essential to your success in the study of economics. CU economics 4000-level courses require knowledge of basic statistical reasoning and understanding. Further, our econometric courses build directly off this course.

COURSE OBJECTIVES

By the end of the course, you should be able to:

1. Describe data with graphs and with statistical tools.
2. Identify probability distributions.
3. Conduct hypothesis testing.
4. Conduct statistical inference.
5. Identify which test to use in which case.
6. Run and interpret a simple lineal regression.

COURSE PREREQUISITES

Requires prerequisite courses of ECON 2010 (Principles of Microeconomics, minimum grade C-) AND either ECON 1088 or MATH 1081 or MATH 1300, MATH 1310, or APPM 1350 (minimum grade C-). Restricted to students with 22-180 units completed.

REQUIRED COURSE MATERIALS

Textbook (required): Moore, D., Motz, W. and Fligner, M., The Basic Practice of Statistics, 9th edition. With Achieve. Macmillan. ISBN: 9781319344634.

You need the version with Achieve since Achieve will be used for problem sets.

You may also buy a hard copy of the book (ISBN:9781319408541), but this is not required.

Day 1 Digital Access: To keep the cost of your course materials as low as possible and access to those materials as convenient as possible, we have collaborated with the CU Book Store and the publisher to deliver those materials through a program called "Day 1 Digital Access", which will appear on your tuition and fee bill as "Day 1 Digital Access". What does this mean for you?

1. You will receive access to all your course materials, digitally, on the first day of classes, through the course Canvas page.
2. You will see a "Day 1 Digital Access" charge on your tuition and fee bill for: approximately **$91.45**
    - This is a guaranteed low price, discounted by the publisher, and not available outside this course
3. You have the option to opt out. This means: you won't pay for anything, but you lose all access to the course materials.
    - You can opt out by: using a link in a reminder email you will receive with the subject heading "Day 1 Digital Access".
    - You must opt out no later than January 30, otherwise you will be charged for the materials.

4. Please keep in mind that "opting out" means that your access to these materials will be turned OFF, and you will have no way to complete assignments.

Course Website: https://canvas.colorado.edu/ (Canvas) Grades and any further additional readings will be posted on Canvas. Please check Canvas frequently for any relevant notifications/changes that may occur throughout the course.

SUPPLEMENTAL MATERIAL

You will use R, a free statistical package to conduct statistical analysis.

INSTRUCTIONAL METHODOLOGY AND DELIVERY

This course is delivered via distance education format using the CU Canvas system. This format will use a combination of readings, online discussion, and other web-based resources. You will interact with the instructor and other students using the communication functions provided by Canvas. You will submit assignments in accordance with the course outline using Canvas. You will also have access to Achieve from the MacMillan Learning catalog.

COURSE PRESENTATION AND PROCEDURES

There will be 14 modules, in 14 weeks (1 module per week). You should proceed through one module every week, which will be comprised of readings from the course texts, supplemental class notes, graded discussion questions, exercises, and quizzes, exams, and various outside sources of information such as additional readings and video content.

COURSE OUTLINE

Review the separate weekly class schedule found on Canvas under "Syllabus" link.

CLASS PARTICIPATION

This course is designed to engage you mostly through exercises, however, there will also be class discussions on the topics covered in the course materials. It is important that you participate in class discussions to facilitate learning by other students and gain exposure to different viewpoints of other students in the class.

EVALUATION AND GRADING

Course grades will be determined by the completion of assignments, exams, and discussions, as shown below:

Assignment	**Points per Assignment**	**Frequency**	**Points**	**Grade Percentage**
Problem Sets*	25	10	250	25%
Proctored Quizzes*	20	10	200	20%
R Exercises	20	7	140	14%
Discussions	20	4	80	8%
Proctored Midterm Exam	150	1	150	15%
Proctored Cumulative Final Exam	180	1	180	18%
TOTAL			1000	100%

Keep a copy of all work created for the course, including work submitted through Canvas.

*The lowest grade of these assignments will be dropped. See below.

COURSE GRADING CRITERIA

Grade	Percentage Grade	Equivalent Points	Indicates
A	94.1-100	941 – 1000	Excellent
A-	90-94	900 – 940	
B+	87-89.99	870 – 899	
B	83-86.99	830 – 869	Above Average
B-	80-82.99	800 – 829	
C+	77-79.99	770 – 799	
C	73-77.99	730 – 769	Average
C-	70-72.99	700 – 729	
D+	67-69.99	670 – 699	
D	63-67.99	630 – 669	Below Average
D-	60-62.99	600 – 629	
F	0-59	600 or lower	Failure

ASSIGNMENTS

Problem Sets (250 POINTS) - There will be eleven 25-point exercises

- Problem Sets consist of quantitative questions where you will complete step by step questions. Problem sets will be on Achieve.
- Your lowest one (1) Problem Set will be dropped from your final grade calculation.

Quizzes (200 POINTS) –There will be eleven proctored quizzes associated with most modules each worth 20 points.

- quizzes will be multiple choice, calculations, and short answers. You must respond to quizzes without outside resources such as AI (ChatGPT), books, notes, open tabs, etc. You will be proctored during these quizzes. You will use Proctorio as a proctoring tool. See below.
- Your lowest one (1) quiz will be dropped from your final grade calculation.

R Exercises (140 POINTS) - There will be seven 20-point R exercises

- R exercises complement the material studied in class with coding tools to run the same analysis in R. R Exercises sets will be accessed through Canvas and you will have to scan your completed problem set and convert it into a pdf document to submit the result on Canvas.

Discussions (80 POINTS) - There will be four 20-point discussion postings.

- The discussion will occur asynchronously; I will post a discussion question and you will respond to the questions at your convenience prior to the due date. Discussions are open book and open note and will be submitted through Canvas. See the class schedule for due dates of posts and comments.

Exams (330 POINTS) – There will be two (2) exams. The proctored midterm exam is worth 150 points and the proctored cumulative final exam is worth 180 points. The format of both exams will be multiple choice and calculations and will be closed book. The exams are completed in a proctored setting.

About Proctoring

Quizzes and exams are proctored which will require planning on your part. Proctors are individuals who administer the exam process following the guidelines provided by University of Colorado Boulder to ensure academic integrity.

All quizzes must be taken via Proctorio, but you have three options to take Exams:

If you are in Boulder or nearby, you can take your exam:

1. At the Department of Economics. There is no cost for using this proctor. This option is only on selected days during the exam period.
2. At the **University Testing Center** on-campus in Boulder, CO. There may be a cost for using the testing center. This option is only available M-F during regular business hours.
3. With **Proctorio.** Online proctoring is a service that uses a webcam and microphone to ensure academic integrity. To use this service, you must have access to a computer with a webcam and a microphone. There will be a cost for using the online proctoring services. Please review Proctorio Minimum System Requirements to ensure you have the correct hardware and software to use this tool.

If you are outside of Boulder, you can take your exam:

1. At **an accredited college or university testing center** in your town or nearby. There may be a cost for using this testing center.
2. With **Proctorio or a comparable online proctoring service as determined by your instructor.** Online proctoring is a service that uses a webcam and microphone to ensure academic integrity. To use this service, you must have access to a computer with a webcam and a microphone. There will be a cost for using the online proctoring services.

- Note that you are required to have a computer with a functioning webcam and microphone or have access to a computer with a functioning webcam microphone to complete your exams.
- See Canvas for detailed information about proctoring. If you are in a rural area or on a military base, you may need approval process.

EXTRA CREDIT

There **MAY OR MAY NOT BE** 30 points of extra credit available (= 3% of the course grade).

- Extra credit may be available during the semester for completing certain activities, such as listening and commenting on a podcast or solving practice exams. These extra credit opportunities will be determined by the instructor and announced on Canvas.

COMMUNICATION

I am nice and I want you to succeed. Do not hesitate to contact me about anything.
E-mail: sara.avila@colorado.edu

- **Please always remind me of what course you are taking**. Since I teach several courses, I forget what course you are taking, especially at the beginning of the semester.
- I will respond to email within 12-18 hours, but usually within 2-4 hours. I always respond to emails. If you have not had a response within 18 hours, I did not receive the email. Be

sure to use your CU email address because sometimes Gmail and yahoo email accounts are filtered into my spam folder.

Additional ways to contact Dr. Avila:

- Online Office Hours: Wednesdays and Thursdays 10 am -12:15 pm using Zoom (https://cuboulder.zoom.us/my/saraavila)
- Announcements: Please check the "announcements" section on Canvas.
- Use the "PLACE TO TALK " discussion board

TUTORING

The Economics Department provides a free drop-in tutorial office which offers assistance on all core courses in the major, and occasionally on other undergraduate courses in the Department. Its website is https://www.colorado.edu/economics/node/513/attachment.

The Economics Department maintains a list of tutors who are available for private hire. Its website is https://www.colorado.edu/economics/node/515/attachment.

ACCEPTABLE USE OF AI IN THIS CLASS

The best use of AI tools like ChatGPT is as a guidance for solving doubts when coding in R. Be aware that the tutoring from AI may be inaccurate, incomplete or wrong.
You may not use AI-based tools to write your discussions. You may not submit any work generated by AI as your own. If you include any material generated by an AI program, then please cite "ChatGPT (date) the text of your query." You must be transparent in how you used the AI tool. Ensure your use of AI-based tools does not violate any copyright or intellectual property laws. Lazy use of AI (cutting and pasting) will result in a zero.

POLICY ON DUE DATES

Each module you will complete quizzes, problem sets, and sometimes discussion posts. It is your responsibility to turn in each assignment on the required date. Exercises or discussion postings turned in after the scheduled due date will be lowered to the next letter grade for each 12-hour period late. The exceptions that may be considered is due to sickness, university excused function, or circumstances beyond the students' control. The instructor reserves the sole right to determine what grounds constitutes a reasonable excuse for missing or submitting a late work assignment, the right to require the student to submit proper verification of such excuse.

NETIQUETTE

All students should be aware that their behavior impacts other people, even online. I hope that we will all strive to develop a positive and supportive environment and will be courteous to fellow students and your instructor. Due to the nature of the online environment, there are some things to remember.

1. Always think before you write. In other words, without the use of nonverbals with your message, your message can be misinterpreted. So please think twice before you hit submit.
2. Keep it relevant. There are places to chat and post for fun everyday stuff. Do not stray from the discussion in the assigned questions.
3. Never use all caps. This is the equivalent of yelling in the online world. It is not fun to read. Only use capital letters when appropriate.
4. Make sure that you are using appropriate grammar and structure. In other words, I don't want to see anyone writing "R U" instead of "are you". There are people in the class that may not understand this type of abbreviation, not to mention it does nothing to help expand your writing and vocabulary skills. Emoticons are fine as long as they are appropriate. A smile 😊 is welcome, anything offensive is not.
5. Treat people the same as you would face-to-face. In other words, it is easy to hide behind the computer. In some cases, it empowers people to treat others in ways they would not in person. Remember there is a person behind the name on your screen. Treat all with dignity and respect and you can expect that in return.
6. Respect the time of others. This class is going to require you to work in groups. Learn to respect the time of others in your group and your experience will be much better. Always remember that you are not the only person with a busy schedule, be flexible. Do not procrastinate! You may be one that works best with the pressures of the deadline looming on you, but others may not be that way. The same is true for the reverse. The key to a successful group is organization, communication and a willingness to do what it takes to get it done.

Website: http://www.albion.com/netiquette/corerules.html
Compiled by Melissa Landin, Instructor, Dept. of Communication, Inver Hills Community College, mlandin@inverhills.edu

TECHNOLOGY SUPPORT

CU Boulder uses Canvas. Here is the list of recommended system requirements: Canvas Computer Specifications Page

Here is the detailed list of internet browsers in Windows, MacOS, iOS and Android: Supported Browsers Page

Technical Support

- Canvas technical support. If you are experiencing issues with Canvas please contact:
    - CU Boulder's Help desk at 303-735-4357 (5-HELP) or help@colorado.edu. 5-Help will answer your call: Monday through Friday from 7:30 a.m. to 7:00 p.m., Saturday and Sunday from noon to 6:00 p.m., Closed during University Holidays
    - On your computer, click the "help" (?) icon on the left side of Canvas, once logged in within the Canvas App, you can search the Canvas support guides, Report a Problem or chat with Canvas Support 24 hours a day, 7 days a week.

- Achieve tech support: https://www.macmillanlearning.com/ed/uk/digital/achieve/support

COURSE WITHDRAWAL POLICY

Any student who wishes to withdraw from the course must submit a request directly to Continuing Education. For complete information, please visit their website at https://ce.colorado.edu/resources/topics/dates-and-deadlines-general-info/

ACCOMODATION FOR DISABILITIES, TEMPORARY MEDICAL CONDITIONS AND MEDICAL ISOLATION

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.

ACCOMODATION FOR RELIGIOUS OBLIGATIONS

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please communicate the need for a religious accommodation in a timely manner.

CLASSROOM BEHAVIOR

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy. For more information, see the classroom behavior policy, the Student Code of Conduct, and the Office of Institutional Equity and Compliance

HONOR CODE

"On my honor, as a University of Colorado Boulder student
I have neither given nor received unauthorized assistance."

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part in adhering to the Honor Code.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Visit Honor Code for more information on the academic integrity policy.

SEXUAL MISCONDUCT, DISCRIMINATION, HARRASSMENT AND/OR RELATED RETALIATION
CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits protected-class discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email cureport@colorado.edu. Information about university policies, reporting options, and support resources including confidential services can be found on the OIEC website.
Please know that faculty and graduate instructors must inform OIEC when they are made aware of incidents related to these policies regardless of when or where something occurred. This is to ensure that individuals impacted receive outreach from OIEC about resolution options and support resources. To learn more about reporting and support for a variety of concerns, visit the Don't Ignore It page.

PREFERRED STUDENT NAMES AND PRONOUNS
CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

MENTAL HEALTH AND WELLNESS
The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact Counseling and Psychiatric Services (CAPS) located in C4C or call (303) 492-2277, 24/7.

Free and unlimited telehealth is also available through Academic Live Care. The Academic Live Care site also provides information about additional wellness services on campus that are available to students.

ADDITIONAL SUPPORT SERVICES
A variety of instructional support services, such as writing center, guidance on personal or educational issues, tutoring questions and library resources are available to the students. For more information about their services, visit their websites linked under modules on Canvas.

Introduction to Statistics, ECON 3818, SUMMER 2025, Avila, University of Colorado Boulder

Module (start date)	Chapter Number and Topic	Graded Assignments	Due Date by *11:59pm* MST/MDT
1 (6/2)	Introduction to R	Discussion posting Module 1 Assignment Discussion comment R Exercise Module 1	Tuesday 6/3 Tuesday 6/3 Wednesday 6/4 Wednesday 6/4
2 (6/5)	1 Picturing Distributions with Graphs 2 Describing Distributions with Numbers	Module 2 Problem Set Module 2 Quiz	Friday 6/6 Sunday 6/8
3 (6/9)	3 The Normal Distribution 4 Scatterplots and correlation	Module 3 Problem Set Module 3 Quiz R Exercise Module 3	Tuesday 6/10 Wednesday 6/11 Wednesday 6/11
4 (6/12)	5 Regression 6 Two-Way tables	Module 4 Problem Set Module 4 Quiz R Exercise Module 4	Friday 6/13 Sunday 6/15 Sunday 6/15
5 (6/16)	Expectations 8 Sampling 9 Experiments	Module 5 Problem Set Module 5 Quiz	Tuesday 6/17 Wednesday 6/18
6 (6/20)	12 Introducing Probability 13 General Rules of Probability	Module 6 Problem Set Module 6 Quiz	Friday 6/20 Sunday 6/22
7 (6/23)	Review	Midterm Discussion Practice Midterm Exam	Wednesday 6/25 Thursday 6/26
MIDTERM (6/26)	You may take the Proctored Midterm Exam the day of your choosing Thursday through Sunday	**Proctored Midterm Exam**	**Thursday 6/26 - Sunday 6/29**
8 (6/30)	14 Binomial Distribution 15 Sampling Distribution	Module 8 Problem Set Discussion Post Module 8 Quiz	Tuesday 7/1 Wednesday 7/2 Wednesday 7/2
9 (7/3)	16 Confidence Intervals 17 Test of significance	Module 9 Problem Set Module 9 Quiz R Exercise Module 9 Discussion Response	Saturday 7/5 Sunday 7/6 Sunday 7/6 Sunday 7/6
10 (7/7)	18 Inference in Practice 20 Inference about a population mean	Module 10 Problem Set Module 10 Quiz R Exercise Module 10	Tuesday 7/8 Wednesday 7/9 Wednesday 7/9
11 (7/10)	21 Inference comparing two means 22 Inference about a population proportion	Module 11 Problem Set Module 11 Quiz R Exercise Module 11	Friday 7/11 Sunday 7/13 Sunday 7/13
12 (7/14)	23 Inference comparing two proportions 24 Inference about variables	Module 12 Problem Set Discussion Post Module 12 Quiz	Tuesday 7/15 Wednesday 7/16 Wednesday 7/16
13 (7/17)	25 Two categorical- chi square 26 Inference for Regression	Module 13 Problem Set Module 13 Quiz R Exercise Module 13 Discussion Response	Friday 7/18 Sunday 7/20 Sunday 7/20 Sunday 7/20
14 (7/21)	You may take the Proctored Final Exam the day of your choosing Thursday through Sunday	Practice Final Exam **Proctored Final Exam**	Thursday 7/24 **Thursday 7/24** **Sunday 7/27**