Instructor: Dr. Sara Avila

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

Voice: (720) 327-1396

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

- Office Hours: Tuesdays and Thursdays 9 am -12 pm using Zoom

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: Jan 23, 2022
Term End: May 7, 2022

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 homework and quizzes.

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 <u>as low as possible</u> and access to those materials as <u>convenient as possible</u>, 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 "<u>Day 1 Digital Access</u>".*
> *What does this mean for you?*
>
> 1. *You will receive access to <u>all</u> 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: <u>**$85.61**</u>*
>   - *This is a guaranteed lowest 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 <u>lose all access</u> 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 September 14, 2022, 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, among other 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*	20	10	200	20%
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	230	1	230	23%
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	93-100	930 – 1000	Excellent
A-	90-92.99	900 – 929	
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

There is +/− grading in this class.

ASSIGNMENTS

Problem Sets (200 POINTS) - There will be a 20-point exercise associated with most modules.
- Problem Sets consist of quantitative questions where you will complete questions while showing your work. 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 quizzes associated with most modules each worth 20 points. The format of the quizzes will be multiple choice, calculations, and short answers and will be open book and open notes. Your lowest one (1) quiz will be dropped from your final grade calculation. Quizzes will also be submitted through Achieve.

R Exercises (140 POINTS) - There will be a 20-point R exercise most weeks
- 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 in order to submit the exercise on Canvas.

Discussions (80 POINTS) - There will be three 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 (380 POINTS) – There will be two (2) exams. The proctored midterm exam is worth 150 points and the proctored cumulative final exam is worth 230 points. The format of the exam will be multiple choice and calculations and will be closed book. The exams are completed on Connect in a proctored setting.

This course requires proctored examinations. 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.

Who can be my proctor?
    <u>**If you are in Boulder or nearby**</u>, 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.

    <u>**If you are outside of Boulder**</u>, 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** 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)

General Course Announcements

- Announcements: Please check the "announcements" section on Canvas.

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.

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.
- Connect tech support:
  - http://mpss.mhhe.com/ or http://bit.ly/StudentRegistration

COURSE POLICIES

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 REQUIREMENTS AND SUPPORT

What are the basic computer specifications for Canvas?

- Visit the official Canvas Computer Specifications Page for the latest list of recommended system requirements.

Which browsers does Canvas support?

- Visit the Supported Browsers Page for the detailed list of internet browsers in Windows, MacOS, iOS and Android.

Skill Requirements

- Students also need to possess basic computer skills, such as:
    o How to use a web browser and word processor
    o How to send and receive email
    o How to locate a file and attach it to an email or upload a file into a course
    o How to copy and paste
    o Must know basic typing skills and keyboard commands
    o Must know basic computer terminology

TECHNICAL SUPPORT

- Canvas technical support. If you are experiencing issues with Canvas please contact:
    o 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
    o On your computer, click the "help" (?) icon on the left side of Canvas, once logged in
    o 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.
- MyLab tech support:
    o https://help.pearsoncmg.com/ccng/ccng_instr/ccng_xmel_instr_help_support_bridge.html or https://support.pearson.com/getsupport/s/

ACCOMODATION FOR DISABILITIES

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.

CLASSROOM BEHAVIOR

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail 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, 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 academic integrity policy. Violations of the Honor Code may include, but are not limited to: plagiarism, 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. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found on the Honor Code website.

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 sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, protected-class discrimination and harassment, and related retaliation by or against members of our community on- and off-campus. These behaviors harm individuals and our community. The Office of Institutional Equity and Compliance (OIEC)

addresses these concerns, and individuals who believe they 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 can be found on the OIEC website.

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of any issues related to these policies regardless of when or where they occurred to ensure that individuals impacted receive information about their rights, support resources, and resolution options. To learn more about reporting and support options for a variety of concerns, visit Don't Ignore It.

RELIGIOUS HOLIDAYS

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See the campus policy regarding religious observances for full details. Because of the flexibility of timing of completion of assignments in this class, you must contact the instructor in at least two weeks in advance if you anticipate a religious holiday may impact your completion of coursework.
For more information on the religious holidays most commonly observed by CU Boulder students consult the online interfaith calendar.

STUDENT 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.

REQUIREMENTS FOR COVID-19
As a matter of public health and safety, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements and all public health orders in place to reduce the risk of spreading infectious disease. CU Boulder currently requires COVID-19 vaccination and boosters for all faculty, staff and students. Students, faculty and staff must upload proof of vaccination and boosters or file for an exemption based on medical, ethical or moral grounds through the MyCUHealth portal.

The CU Boulder campus is currently mask-optional. However, if public health conditions change and masks are again required in classrooms, students who fail to adhere to masking requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct and Conflict Resolution. For more information, see the policy on classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from fulfilling these safety measures, please follow the steps in the "Accommodation for Disabilities" statement on this syllabus.

If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the Public Health Office (contacttracing@colorado.edu). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the Public Health Office (contacttracing@colorado.edu).

COURSE WITHDRAWAL POLICY

Any student who wishes to withdraw from the course must do so by September 7. For complete information, please visit https://ce.colorado.edu/resources/topics/dates-and-deadlines-general-info/

ACCOMMODATION FOR DISABILITIES

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.

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, SPRING 2023, Avila, University of Colorado Boulder

Module (start date)	Chapter Number and Topic	Graded Assignments	Due Date by *11:59pm* MST/MDT
1 (1/23)	Introduction to R	Discussion posting Module 1 Assignment Discussion comment R Exercise Module 1	Thursday 1/26 Thursday 1/26 Sunday 1/29 Sunday 1/29
2 (1/30)	1 Picturing Distributions with Graphs 2 Describing Distributions with Numbers	Module 2 Problem Set Module 2 Quiz	Thursday 2/2 Sunday 2/5
3 (2/6)	3 The Normal Distribution 4 Scatterplots and correlation	Module 3 Problem Set Module 3 Quiz R Exercise Module 3	Thursday 2/9 Sunday 2/12 Sunday 2/12
4 (2/13)	5 Regression 6 Two-way tables	Module 4 Problem Set Module 4 Quiz R Exercise Module 4	Thursday 2/16 Sunday 2/19 Sunday 2/19
5 (2/20)	Expectations 8 Sampling 9 Experiments	Module 5 Problem Set Module 5 Quiz	Thursday 2/23 Sunday 2/26
6 (2/27)	12 Introducing Probability 13 General Rules of Probability	Module 6 Problem Set Module 6 Quiz	Thursday 3/2 Sunday 3/5
MIDTERM (3/6)	You may take the proctored midterm exam the day of your choosing Thursday through Sunday.	Practice Midterm Exam Midterm Discussion **Proctored Midterm Exam**	Thursday 3/9 Thursday 3/9 **Thursday 3/9-Sunday 3/12**
8 (3/13)	14 Binomial Distribution 15 Sampling Distribution	Module 8 Problem Set Discussion Post Module 8 Quiz Discussion Module 8	Thursday 3/16 Thursday 3/16 Sunday 3/19 Sunday 3/19
9 (3/20)	16 Confidence Intervals 17 Test of significance	Module 9 Problem Set Module 9 Quiz R Exercise Module 9	Thursday 3/23 Sunday 3/26 Sunday 3/26
10 (4/3)	18 Inference in Practice 20 Inference about a population mean	Module 10 Problem Set Module 10 Quiz R Exercise Module 10	Thursday 4/6 Sunday 4/9 Sunday 4/9
11 (4/10)	21 Inference comparing two means 22 Inference about a population proportion	Module 11 Problem Set Module 11 Quiz R Exercise Module 11	Thursday 4/13 Sunday 4/16 Sunday 4/16
12 (4/17)	23 Inference comparing two proportions 24 Inference about variables	Module 12 Problem Set Discussion Post Module 12 Quiz Discussion Module 12	Thursday 4/20 Thursday 4/20 Sunday 4/23 Sunday 4/23
13 (4/24)	25 Two categorical- chi square 26 Inference for Regression	Module 13 Problem Set Module 13 Quiz R Exercise Module 13	Thursday 4/27 Sunday 4/30 Sunday 4/30
FINAL (5/1)	You may take the proctored Final Exam the day of your choosing Thursday through Sunday	Practice Final Exam **Proctored Final Exam**	Wednesday 5/3 **Thursday 5/4-Sunday 5/7**