



University of Colorado Boulder  
INTRODUCTION TO STATISTICS WITH COMPUTER APPLICATIONS  
ECON 3818 SYLLABUS, FALL 2021

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Instructor: Dr. Sara Avila

Email: [sara.avila@colorado.edu](mailto:sara.avila@colorado.edu)

Voice: (720) 327-1396

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

- Office Hours: Wednesdays and Thursdays 10 am -12:15 pm using Canvas Chat or 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 runner coming back from an injury, and I am grateful to have the opportunity to share with you this learning experience.

**Term Start:** Aug 30, 2021

**Term End:** Dec 12, 2021

### 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, 9<sup>th</sup> edition. With Achieve. Macmillan. ISBN: 9781319344634.

You need the version with Achieve since Achieve will be used for homeworks and quizzes.

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

**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 statistical package free 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, homeworks 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 through exercises and two class discussions on the topics covered in the course materials. It is important that you participate in exercises and class discussions.

## EVALUATION AND GRADING

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

Assignment	<i>Points per Assignment</i>	<i>Frequency</i>	<i>GRADE POINTS</i>	<i>GRADE PERCENTAGE</i>
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%
<b>TOTAL</b>			<b>1000</b>	<b>100%</b>

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

<i>Grade</i>	<i>Percentage Grade</i>	<i>Equivalent Points</i>	<i>Indicates</i>
<b>A</b>	93-100	930 – 1000	Excellent
<b>A-</b>	90-92.99	900 – 929	
<b>B+</b>	87-89.99	870 – 899	
<b>B</b>	83-86.99	830 – 869	Above Average

<b>B-</b>	80-82.99	800 – 829	
<b>C+</b>	77-79.99	770 – 799	
<b>C</b>	73-77.99	730 – 769	<i>Average</i>
<b>C-</b>	70-72.99	700 – 729	
<b>D+</b>	67-69.99	670 – 699	
<b>D</b>	63-67.99	630 – 669	<i>Below Average</i>
<b>D-</b>	60-62.99	600 – 629	
<b>F</b>	0-59	600 or lower	<i>Failure</i>

*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 are dropped from your final grade calculation. Quizzes will 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.
- Your lowest one (1) R exercise will be dropped from your final grade calculation.

**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?

**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 **ProctorU 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 50 points of extra credit available (= 5% 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](mailto:sara.avila@colorado.edu)**

- **Please always remind me of what course you are taking.** Since I teach similar 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.

Mobile: (720) 327-1396

- This is my cell phone number. Call or text anytime between 8am – 9pm MTN. I sometimes have my phone turned off during the middle of the day but leave a message when it is a good time to get a hold of you and I will call you back.

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](mailto: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.

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/>

## POLICY ON DUE DATES

Each lecture you will complete Problem Sets, Quizzes, R Exercises 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, do not use "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 (or kinder). It might be 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.

Website: <http://www.albion.com/netiquette/corerules.html>

Compiled by Melissa Landin, Instructor, Dept. of Communication, Inver Hills Community College, [mlandin@inverhills.edu](mailto:mlandin@inverhills.edu)

## 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 policies on [classroom behavior](#) and the [Student Conduct & Conflict Resolution policies](#).

## REQUIREMENTS FOR COVID-19

As a matter of public health and safety due to the pandemic, 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. When attending in-person class, students who fail to adhere to these 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.

As of Aug. 13, 2021, CU Boulder has returned to requiring masks in classrooms and laboratories regardless of vaccination status. This requirement is a temporary precaution during the delta surge to supplement CU Boulder’s COVID-19 vaccine requirement. Exemptions include individuals who cannot medically tolerate a face covering, as well as those who are hearing-impaired or otherwise disabled or who are communicating with someone who is hearing-impaired or otherwise disabled and where the ability to see the mouth is essential to communication. If you qualify for a mask-related accommodation, please follow the steps in the “Accommodation for Disabilities” statement on this syllabus. In addition, vaccinated

instructional faculty who are engaged in an indoor instructional activity and are separated by at least 6 feet from the nearest person are exempt from wearing masks if they so choose.

Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home. In this class, if you are sick or quarantined, you can have access to all the materials online. Get in touch with me if you need anything else.

## 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](mailto:dsinfo@colorado.edu) for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

## PREFERRED STUDENTS' 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.

## HONOR CODE

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: 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](mailto:honor@colorado.edu)); 303-492-5550). Students who are 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 at the [Honor Code Office website](#).

## SEXUAL MISCONDUCT, DISCRIMINATION, HARASSMENT AND/OR RELATED RETALIATION

The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct intimate partner abuse (including dating or domestic violence), stalking, protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#). Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

## 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. 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](#).

### 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/>

### 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, Fall 2021, Avila, University of Colorado Boulder

Module (start date)	Chapter Number and Topic	Graded Assignments	Due Date by 11:59pm MST/MDT
1 (8/30)	Introduction to R	Discussion posting Discussion comment R Exercise Module 1	Thursday 9/2 Sunday 9/5 Sunday 9/5
2 (9/6)	1 Picturing Distributions with Graphs 2 Describing Distributions with Numbers	Module 2 Problem Set Module 2 Quiz	Thursday 9/9 Sunday 9/12
3 (9/13)	3 The Normal Distribution 4 Scatterplots and correlation	Module 3 Problem Set Module 3 Quiz R Exercise Module 3	Thursday 9/16 Sunday 9/19 Sunday 9/19
4 (9/20)	5 Regression 6 Two-way tables	Module 4 Problem Set Module 4 Quiz R Exercise Module 4	Thursday 9/23 Sunday 9/26 Sunday 9/26
5 (9/27)	8 Sampling 9 Experiments	Module 5 Problem Set Module 5 Quiz R Exercise Module 5	Thursday 9/30 Sunday 10/3 Sunday 10/3
6 (10/4)	Expectations 12 Introducing Probability 13 General Rules of Probability	Module 6 Problem Set Module 6 Quiz Discussion Module 6	Thursday 10/7 Sunday 10/10 Sunday 10/10
7 (10/11)	<b>You may take the PROCTORED midterm exam the day of your choosing Thursday through Sunday.</b>	<b>Proctored Midterm Exam</b>	<b>Thursday 10/14 - Sunday 10/17</b>
8 (10/18)	14 Binomial Distribution 15 Sampling Distribution	Module 8 Problem Set Module 8 Quiz	Thursday 10/21 Sunday 10/24
9 (10/25)	16 Confidence Intervals 17 Test of significance	Module 9 Problem Set Module 9 Quiz R Exercise Module 9	Thursday 10/28 Sunday 10/31
10 (11/1)	18 Inference in Practice 20 Inference about a population mean	Module 10 Problem Set Module 10 Quiz R Exercise Module 10	Thursday 11/4 Sunday 11/7 Sunday 11/7
11 (11/8)	21 Inference comparing two means 22 inference about a population proportion	Module 11 Problem Set Module 11 Quiz Discussion Module 11	Thursday 11/11 Sunday 11/14 Sunday 11/14
12 (11/15)	23 Inference comparing two proportions 24 Inference about variables	Module 12 Problem Set Module 12 Quiz R Exercise Module 12	Thursday 11/18 Sunday 11/21 Sunday 11/21
13 (11/29)	25 Two categorical- chi square 26 Inference for Regression	Module 13 Problem Set Module 13 Quiz R Exercise Module 13	Thursday 12/2 Sunday 12/5 Sunday 12/5
14 (12/6)	<b>You may take the PROCTORED cumulative final exam the day of your choosing Thursday through Sunday.</b>	<b>Proctored Final Exam</b>	<b>Thursday 12/9- Sunday 12/12</b>