
Economics 3818-020: Introduction to Statistics with Computer Applications
Spring 2024
Department of Economics
University of Colorado Boulder

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Lecture Classroom: MUEN E417
Class Meeting Time: TTH 09:30 AM - 10:45 AM

In-person Office Hours: TTH 10:55 AM - 12:25 PM and by appointment

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Recitation 021
Classroom: HUMN 180
Meeting Time: T 3:35-4:25

Recitation 022
Classroom: ECON 205
Meeting Time: TH 12:20-1:10

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 3818-010: Introduction to Statistics with Computer App”
- Note: all email correspondence will be through your CU Boulder email address. Do not use the Canvas mail or messages, it is not checked.

Course Overview

The purpose of this course is to introduce 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: describing data with graphs and numbers, basic probability rules, sampling distributions of test statistics, hypothesis testing, and confidence intervals across multiple settings covered in the course, and finally knowledge of simple regression. This course introduces R open source package to help you apply your statistical understanding and skills using computer. This foundational course is essential to your success in the study and long-run understanding of economics. CU economics 4000-level courses require knowledge of basic statistical reasoning and understanding. Further our required econometrics courses build directly off of this course. Finally, this course helps you build a skill that has enormous potential financial

return in the marketplace.

The course consists of five closely related parts. The first part of the course introduces ways to explore data using visual and numerical measures. You will learn about summary measures for single variables and we will consider relationships between variables. The second part of the course introduces you to basic probability theory, popular probability distributions, and mathematical expectation. The third part of the course introduces you to sampling distributions and their properties, properties of estimators, confidence intervals, and hypothesis testing. The fourth part of the course is all applied statistical inference including inference about the mean of a probability distribution, inference about differences in two population means, inference about a single proportion from a population, and inference about differences in two proportions. The fifth and final part of the course further explores correlation and simple regression analysis and then adds inference about simple regression.

Course Modality

This is an in-person course. You will be required to come to class and recitation. No part of this course is remote. We are hoping the in-person experience will make for a richer and less isolating learning experience for you. **More than 75% of class attendance is required to pass this course.** Otherwise, students will automatically get the failing grade.

Recitations are mandatory. They should be canceled only under extraordinary circumstances. By Department policy, recitations are not held during the first week of class. For this semester, recitations should begin on **Monday, January 22nd**. Recitations must continue **through the last week of classes.**

Textbook

The Basic Practice of Statistics, 9th Edition, by David Moore, William Motz, and Michael Fligner. The course will use MacMillan Publishing's Achieve homework system that comes with an electronic version of the book embedded in the system. You will sign up for the Basic Practice of Statistics + Achieve System (\$91.45 before tax) through Canvas. **Detailed instructions for signing up are provided on the course Canvas site.**

Class Technology

Achieve Learning System

The course will use the Macmillan Publishing, Achieve Learning system for Learning Curve, Homework, and Quiz assignments. **There are instructions to sign up for Achieve through Canvas found in the Getting Started Module.**

Clickers - The class and recitation sections will use clickers. Answers to clickers questions will be used for class attendance and will be a part of your grade. You will need to sign up for iClicker. **There are instructions to sign up for iClicker through Canvas found in the Getting Started Module.**

Handheld Calculator – You will need a handheld calculator to do calculations in class, particularly during exams. You cannot use your phone or borrow your neighbor's

calculator during exams. Graphing calculators such as the TI-83 or TI-84 are popular because they have a full array of built-in statistical functions plus graphing capabilities. Graphing is a nice extra, but not required. The main thing you will need is a calculator with full statistical functions. You will need to be versed in using these calculators for exams, and neither I nor the TA will be training you.

R Computer Applications –R is a free programming language that is available for Windows, Mac, and Unix operating systems. It is pre-installed on computers in most University computer labs and can be downloaded from the Internet. You will use the R Studio Interface to do R exercises. We will spend some of our class/recitation time working on these. R has good self-contained documentation in the basic R installation. On your first R exercise, you will get some basic training on how to install and do some basic operations in R. I will help you through the semester. An additional free resource is the book Modern R with the tidyverse by Bruno Rodrigues:

https://b-rodrigues.github.io/modern_R/

This free ebook provides instruction on programming in R. But mainly we are going to implement the things we learn from the textbook.

Class Support/Help (Also found on Canvas)

(1) The primary help options for the course are the professor and teaching assistant who have regular office hours.

(2) 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>.

(3) 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>.

(4) The Office of Victim Assistance can be reached at 303-492-8855. Its webpage is <http://www.colorado.edu/ova/>.

(5) The webpage <https://www.colorado.edu/undocumentedstudentresources> contains information regarding campus counseling resources available for students and employees with DACA Status.

(6) The website <https://www.colorado.edu/redfolder> provides guidance with regard to assisting students in distress.

Do not fall behind in this course. Students who keep up with all assignments tend to succeed in the course. Failing to keep up often results in failing the course. Do the required work and use the help available to you in order to master the material. I want you to succeed in this course.

Course Topics (in order)

Module 0

- Introduction to R

- Chapter 0 Getting Started
- Module 1
- Chapter 1 Picturing Distributions with Graphs
 - Chapter 2 Describing Distributions with Numbers
- Module 2
- Chapter 3 The Normal Distributions
 - Chapter 4 Scatterplots and Correlation
- Module 3
- Chapter 5 Regression
 - Chapter 6 Two-Way Tables
- Module 4
- Chapter 8 Sampling
 - Chapter 9 Experiments
- Module 5
- Chapter 12 Introducing Probability
 - Chapter 13 General Rules of Probability
- Module 6
- Chapter 14 Binomial Distributions
 - Mathematical Expectation
- Module 7
- Chapter 10 Data Ethics
 - Chapter 15 Sampling Distributions
- Module 8
- Chapter 16 Confidence Intervals: The Basics
 - Chapter 17 Tests of Significance: The Basics
- Module 9
- Chapter 18 Inference in Practice
 - Chapter 20 Inference about a Population Mean
- Module 10
- Chapter 21 Comparing Two Means
 - Chapter 22 Inference about a Population Proportion
- Module 11
- Chapter 23 Comparing Two Proportions
 - Chapter 24 Inference about Variables: Part IV Review
- Module 12
- Chapter 26 Inference for Regression

Prerequisites: Econ 2010 and Econ 2020 and either Econ 1088 or Math 1081 or Math 1300 or Math 1310 or APPM 1350 (all minimum grade C-). Restricted to students with 22-180 units completed.

Course Evaluation

Clicker/Attendance	5%
Learning Curve (LC)	10%
Chapter Homework Exercises (HW)	12%
Quizzes (QZ)	12%
R Exercises	12%

Midterm 1	12%
Midterm 2	12%
Final	15%
Recitation	10%

Clicker/Attendance (5%): Clickers questions will be asked for the content learned during the class. Class attendance is automatically recorded once logged in at the iClicker cloud. Students are required to attend the class regularly. For flexibility of class attendance, you **may miss up to three sessions** for any (medical) reason with no penalty. Beyond these three, each absence will lower your grade unless we've come to an agreement in advance (regarding medical concerns, for example.) You'll be responsible for making up missed work and material for any missed class by liaising with your classmates. **More than 3/4 of the class attendance** is required to pass the course. Otherwise, students will automatically get the failing grade.

Learning Curve (LC), Chapter Homework Exercises (HW) and Quizzes (QZ) (34%): There will be weekly assignments for each chapter that are due at sets times. The lowest 2 scores of each LC, HW and QZ will be dropped (In other words, you **may miss up to 2 out of a series of the each weekly assignment** to receive full credit). **No late assignments will be accepted.** Assignments days are set for Learning Curve on M/W (total 21), HW on Thursday of the following next week (total 23), and Quizzes on Saturday of the following next week (total 11). Learning curve and Homework are allowed for unlimited attempts per question with small penalty. Multiple attempts are not allowed for Quizzes.

R exercises (12%): R exercises (total 6) are for writing and executing R scripts to solve statistical problems. Computer applications on selected chapter contents will be examined. It is o.k. to discuss with classmates on the right R scripts but final submission should be your original and unique work. Copying and pasting a part of your peer's work will get a zero point and a penalty. **The lowest score will be dropped** (i.e. you may miss one R assignment without penalty or explanation).

Tests (39%): The three exams will be combinations of analytical problems and multiple choice questions of topics covered in class. Missing an exam should be avoided. **No (remote) makeup exams will be given.** For students who miss their exams for medical reasons, a make-up exam may be given when the student returns to class. The midterm exam 1 (12%), the midterm exam 2 (12%), and the final exam (15%) will be on the specified chapters of the texts. The final exam is not cumulative. **Final exam is held in person.** Students who have more than two final exams on the same day are entitled to reschedule all exams after the first two. The deadline for making these arrangements is *Friday, March 22.*

Letter Grade will be assigned as follows:

A	100 %	to 95.0%
A-	< 95.0 %	to 85.0%
B+	< 85.0 %	to 82.0%
B	< 82.0 %	to 80.0%
B-	< 80.0 %	to 76.0%

C+	< 76.0 %	to 74.0%
C	< 74.0 %	to 70.0%
C-	< 70.0 %	to 65.0%
D+	< 65.0 %	to 62.0%
D	< 62.0 %	to 45.0%
D-	< 45.0 %	to 40.0%
F	< 40.0 %	to 0.0%

Important Dates

January 16 (Tue.) – First Day of this Class

February 15, Thursday – Midterm 1

March 21, Thursday – Midterm 2

March 25-29 (Mon.-Fri.) – Spring Break (campus closed Fri., March 29)

May 2 (Thurs.) – Last Day of this Class

Tuesday, May 7, 4:30–7 p.m. (Econ 3818-020) – Final Exam, MUEN E417.

Policy on Due Dates

It is your responsibility to turn in each assignment on the required date. **Late submissions are not accepted for any of the assignments or exams.** Some 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 and the right to require the student to submit proper verification of such excuse.

University Policies

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, 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](#).

Requirements for Infectious Disease

Members of the CU Boulder community and visitors to campus must follow university, department, and building health and safety requirements and all applicable campus policies and public health guidelines to reduce the risk of spreading infectious diseases. If public health conditions require, the university may also invoke related requirements for student conduct and disability accommodation that will apply to this class.

If you feel ill and think you might have COVID-19 or if you have tested positive for COVID-19,

please stay home and follow the [guidance of the Centers for Disease Control and Prevention \(CDC\) for isolation and testing](#). If you have been in close contact with someone who has COVID-19 but do not have any symptoms and have not tested positive for COVID-19, you do not need to stay home but should follow the [guidance of the CDC for masking and testing](#).

Accommodation 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.

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.

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 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.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: honor@colorado.edu, 303-492-5550. 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. **In this class, ChatGPT is banned.**

Sexual Misconduct, Discrimination, Harassment 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 violence (dating or domestic violence), stalking, 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 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 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](#).

Religious Accommodations

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.

See the [campus policy regarding religious observances](#) for full details.

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.