
Economics 3818-040: Introduction to Statistics with Computer Application
Fall 2022
Department of Economics
University of Colorado Boulder

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Lecture Classroom: ECON 117
Class Meeting Time: T/TH 02:00 PM – 03:15 PM

In-person Office Hours: T/TH 3:15 PM – 5:30 PM.

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Zoom Office Hours: TBA
Zoom ID on Canvas Course Site

Recitation 041
Classroom: CRTS E155
Meeting Time: T 3:35-4:25

Recitation 042
Classroom: ECON 205
Meeting Time: TH 11:15-12:05

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 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.

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 Tuesday, August 30th. 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 (\$85.61 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 book in R.

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>.

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	10%
Chapter Homework Exercises	12%
Quizzes	12%
R Exercises	12%
Midterm 1	12%
Midterm 2	12%
Final	15%
Recitation	10%

Important Dates

August 23 – First Day of Class

September 22 – Midterm 1

October 27 – Midterm 2

November 21 – 23 (Mon. – Wed.) – Fall Break

November 24 – 25 (Thurs.-Fri.) – Thanksgiving (campus closed)
December 8 (Thurs.) – Last Day of Class
Wednesday, Dec. 14 – Final Exam, ECON 117, 4:30-7 p.m. (Econ 3818-040)

University Policies

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](#).

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). In this class, if you are sick or quarantined, you should contact the professor in order to make arrangements to keep up with the class and makeup assignments if necessary.

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.

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, 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. Additional information regarding the Honor Code academic integrity policy can be found on the [Honor Code website](#).

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 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 policies, 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. In this class, if you have an upcoming religious holiday you should notify the professor or teaching assistant of the observance and how it might affect attendance or turning in assignments. It is your responsibility to notify your teacher or teaching assistant in advance for an accommodation.

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