Course Syllabus
University of Colorado Boulder
Introduction to Statistics with Computer Application
Economics 3818-040
Spring 2021

Professor: Nicholas E. Flores
Voice: 303 492-8145
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Lecture Classroom: Case E380
Class Meeting Time: T/TH 12:45 – 2:00 p.m.

Zoom Office Hours: T 2:15 – 3:15 p.m., TH 10:00-11:00 a.m. and by appointment
Zoom ID on Course Canvas Site

Teaching Assistant: TBD
Email: TBD
Office: TBD

Recitation 041
Classroom: Case E340
Meeting Time: M 12:40-1:30 p.m.

Recitation 042
Classroom: Ramy C250
Meeting Time: W 4:10-5:00 p.m.

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 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. 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 explores correlation, simple regression analysis, and inference about simple regression.

Course Modality

This is an in-person course. This means that when the campus is out of remote-only mode you will be expected to come to class and recitation. The department made the decision to provide ample remote-only courses for those who do want to come to campus along with in-person, as opposed to hybrid, for those who prefer in-person teaching. In talking with students from spring 2020 and fall 2021, we learned that many students want the in-person experience yet fail to show up if things are also offered remotely. In this course you will be required to come into campus for class and recitation. We are hoping the in-person experience will make for a richer and less isolating learning experience for you.

The course will begin the semester in the remote-only modality and continue until the campus instructs us to move out of remote-only mode. The current campus plan is for campus to reopen for students on February 15th. Until the move from remote-only, lectures and recitations will via Zoom at the appointed times. You will be expected to join these lectures and recitation live via Zoom.

Textbook

The Basic Practice of Statistics, 8th Edition, by David Moore, William Motz, and Michael Fligner. The course uses the Sapling Learning system provided by the publisher, Macmillan Learning. There is a $92.00 charge for this service and it comes with access to an online version of the book at no additional charge. You must sign up through Canvas and use Sapling. You can rent or buy the book from the publisher, MacMillan Learning, or Amazon.

Class Technology

Sapling Learning System

The course will use the Macmillan Publishing, Sapling Learning system for homework and some quizzes. **There are instructions to sign up for Sapling through Canvas found in the Getting Started Module**. You must use this system for homework and quizzes assigned there.

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 Reef that will be used when we are in remote-only and online teaching modes. **There are instructions to sign up for iClicker Reef through Canvas found in the Getting Started Module**. When we are remote only, iClicker Reef will allow you to use mobile devices and computers connected to the internet to answer questions. When we are in-person, you will likely need a handheld clicker that syncs with the in-class clicker receiver. **Our classroom has clicker frequency BC.** I say "you will likely need" because I was told by OIT that under normal student density situations, there may not enough band width in class for everyone to use the remote, cloud-based system. Hold off on getting a clicker until we are in-person.

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 statistical functions built in 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 Mac, Windows, 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 Rodgrigues:

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 department offers a free drop-in tutoring lab. Information can be found by clicking here.

(3) There are private tutors that provide one-on-one help for a fee. The department keeps a list of potential tutors that can be found by clicking here.

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 to in order to master the material. I want you to succeed in the course.

Course Topics (in order)

Module 1
- Introduction to R

Module 2
- Chapter 1 Picturing Distributions with Graphs
- Chapter 2 Describing Distributions with Numbers

Module 3
- Chapter 12 Introducing Probability
- Chapter 13 General Rules of Probability
- Supplemental Probability Problems

Module 4
- Chapter 14 Binomial Distributions
- Chapter 3 The Normal Distributions

Module 5
- Mathematical Expectation
- Chapter 8 Sampling
- Chapter 9 Experiments

Module 6
- Chapter 10 Data Ethics
- Chapter 15 Sampling Distributions

Module 7
- Chapter 16 Confidence Intervals: The Basics
- Chapter 17 Tests of Significance: The Basics

Module 8
- Chapter 18 Inference in Practice
- Chapter 20 Inference about a Population Mean

Module 9
- Chapter 21 Inference Comparing Two Means
- Chapter 22 Inference about a Population Proportion

Module 10
- Chapter 23 Inference Comparing Two Proportions
- Chapter 24 Inference about Variables: Part IV Review

Module 11
- Chapter 4 Scatterplots and Correlation
- Chapter 5 Regression

Module 12
- Chapter 26 Inference for Regression
- Chapter 6 Two-Way Tables

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/Participation/Attendance	8%
Weekley Check-in	2%
Module Exercises	15%
R Exercises	10%
Recitation	10%
Quizzes	10%
Midterm 1	15%
Midterm 2	15%
Final	15%

Important Dates

January 14 – First Day of Class
February 16 – Midterm 1
March 18 – Midterm 2
March 25 – Wellness Day (no class)
April 29 – Last Day of Class
Sunday May 2 – Final Exam, Case E380, 4:30-7 p.m.

Course Policies

Attendance

Daily attendance will be taken for each class. You must attend a minimum of 80% of the lectures in order to pass the course and separately the recitation. **If you miss more than 20% of the lectures, more than 6 absences, you will receive an automatic F in the course.** Attendance will be recorded through a daily sign-in sheet.

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 policies on classroom behavior and the Student Code of Conduct.

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 public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:

- maintain 6-foot distancing when possible,
- wear a face covering in public indoor spaces and outdoors while on campus consistent with state and county health orders,
- clean local work area,
- practice hand hygiene,
- follow public health orders, and
- if sick and you live off campus, do not come onto campus (unless instructed by a CU Healthcare professional), or if you live on-campus, please alert CU Boulder Medical Services.

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 policies on COVID-19 Health and Safety and classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from fulfilling these safety measures, please see the "Accommodation for Disabilities" statement on this syllabus.
All students who are new to campus must complete the COVID-19 Student Health and Expectations Course. Before coming to campus each day, all students are required to complete the Buff Pass. ***In this class, you may be reminded of the responsibility to complete the Buff Pass and given time during class to complete it.***

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 need to contact Professor Flores to notify him you will not be attending class.

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 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); 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 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 an inclusive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or 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. Information about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website.
Please know that faculty and graduate instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, dating and domestic violence, stalking, 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. 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 accomodation.

See the campus policy regarding religious observances for full details.