**University of Colorado Boulder**
**Introduction to Statistics with Computer Applications**
**ECON3818**

**Spring 2021**

Instructor: Shawn Swanson
Class Meetings: Lectures will be held live during the scheduled class time remotely via Zoom
Office Hours: MWF 11:10 am – 12:40 pm online via Zoom
Zoom: https://cuboulder.zoom.us/my/ask.shawn
Email: shawn.swanson@colorado.edu

**Section Specific Information**

| Section | Class Time | TA | Final Exam |
|---|---|---|---|
| 3818-010 | MWF 10:20-11:10 am | Yuwei Jia | Sun, May 2, 1:30-4:00 |
| 3818-020 | MWF 12:40-1:30 pm | Mark Valkovci | Mon, May 3, 1:30-4:00 |
| 3818-030 | TR 2:20-3:35 pm | Jaekyeong (Jay) Shin | Tue, May 4, 4:30-7:00 |

**Course Description**

Statistics is an important and fun component of economics. Further, employers value those who have an understanding of statistics and therefore this knowledge can directly translate into success in the job market. In this course we will cover the following concepts: visual and numerical exploration of data, basic probability theory and probability distributions, mathematical expectation, sampling distributions and their properties, properties of estimators, confidence intervals, hypothesis testing, applied statistical inference, correlation, regression analysis, and inference in regression analysis.

**Lectures**

All lectures will be given live remotely via Zoom and recorded and posted to Canvas for your convenience. The recorded lectures are a useful tool, which will allow you to slowdown, fast forward, and pause lectures to increase comprehension. They also allow you to watch lectures you may have missed. **However, watching recorded lectures does not replace attending the live lectures.**

**Prerequisites**

Econ 2010 & 2020. Econ 1088 (or an approved substitute). This class requires algebra and calculus so exposure to these concepts is required.

**Required Textbook**

SaplingPlus for *The Basic Practice of Statistics*
By David Moore, William Notz, and Michael A Fligner

This includes access to an online version of the textbook. (Hardcopies are also available for purchase.) We will use Sapling for homework; therefore, it is absolutely necessary.

The CU Book Store will bill these materials to each student, in exchange for a reduced price from the publisher. The Book Store handles the billing of students' accounts, and the publisher handles the logistical and instructor side on Canvas.

**Canvas**

Lecture notes and recordings as well as homework assignments and R exercises can be found on the home page of this course in Canvas. All grades will be posted on Canvas as soon as they are available.

**Technology Requirements**

An electronic device that can access the internet and has audio and video capture is required. This will be necessary to access lectures, office hours, do homework, take exams, etc.

*iClicker Cloud:* This will be used to gauge participation and understanding. Clicker information can be found on the Office of Information Technology (OIT) website: https://oit.colorado.edu/services/learning-spaces-technology/cuclickers/help/student-resources

*RStudio Desktop:* R is a free programming language that is utilized primarily for data analysis. We will spend time throughout the course working on R exercises using the RStudio interface. The RStudio Desktop interface can be download from: https://rstudio.com/products/rstudio/download/#download
Upon initial startup of the interface, you will be prompted to install R, if you have not already done so. Follow the prompts as directed.

*Zoom*: Zoom will be used for live remote lectures and office hours as well as to proctor online exams. Please comport yourself for Zoom interaction as you would for in-person instruction, e.g. wear clothing. My Zoom contact is noted at the top of the syllabus. Additional Zoom information can be found on the OIT website: https://cuboulder.zoom.us/

**Grading**

**There will be no makeup work or makeup exams in this class. I drop your lowest two homework assignments, which is intended to accommodate whatever life events might impact your studies, excused or otherwise. If you miss a midterm for an excusable reason, the weight of that exam will be added your final.** Your total grade in this course will be determined as follows:

| | | | |
|---|---|---|---|
| • Participation | 10% | • Quizzes | 10% |
| • Recitation | 10% | • R exercises and Project | 10% |
| • Homework | 10% | • Midterm 1 | 15% |
| • Midterm 2 | 15% | • Final | 20% |

*Participation:* Your participation grade will be predicated on attending the live Zoom lectures. I will monitor this using iClickers. You will receive 3 point for answering a question and an additional point for answering correctly. **You must have your camera on to receive participation points. Note that attendance of live lectures is required to pass the class and is therefore mandatory.**

*Recitation:* Recitation attendance is mandatory. Not only will your grade in recitation account for 10% of your final grade, but there will be material provided in recitation that is crucial for your success in this course. Your TA will determine your recitation grade.

*Homework and R:* There will be 10 online homework assignments found on Canvas. There will also be five R exercises and an R project. We will work on the R exercises together in class on certain days. In addition, you will complete a project of your own in R. The R exercises will count for half of your R grade and your project the other half. **R exercises and homework are due Sundays before 11:59 PM unless otherwise announced (No Exceptions). Note that late homework assignments will not be accepted, instead your lowest two homework assignments will be dropped.**

*Exams:* Exams will be administered through Canvas and will be proctored via Zoom. Prior to the exam period, students will sign into Zoom using video in order to be proctored. Exams will be open note, but you cannot rely on the help of others. **Anyone *suspected* of cheating will automatically fail the course. If you miss a midterm for an excusable reason, the weight of that exam will be added your final.**

*Extra Credit:* Extra credit assignments will be available on Canvas. It will be worth a maximum of 5% towards your final grade. No other extra credit is available.

*Letter Grades:*
Scores may be curved at the instructor's discretion. Your (curved) final course grade will automatically be increased up to 0.5% to meet any grade cutoff. No further grade adjustments are available. There will be no extra credit. Letter grades will be assigned as follows:

| Percentage | Grade | Percentage | Grade |
|---|---|---|---|
| 94-100 | A | 73-76 | C |
| 90-93 | A- | 70-72 | C- |
| 87-89 | B+ | 67-69 | D+ |
| 83-86 | B | 63-66 | D |
| 80-82 | B- | 60-62 | D- |
| 77-79 | C+ | 0-59 | F |

**Exam Dates (tentative)**

| | | |
|---|---|---|
| Midterm 1 | Week 7 | Online, during class time |
| Midterm 2 | Week 12 | Online, during class time |

All exams will take place on Canvas and will be proctored via zoom, unless otherwise noted.

**Course Resources and Recipe for Success**

Let me be clear, **I want you to be successful in this course.** I will do whatever I can to help you learn. Therefore, there are numerous resources for you to succeed.

*Office Hours*: I will hold office hours online via Zoom during the times noted at the top of the syllabus. This is an excellent opportunity to get additional clarification and get one-on-one instruction. I love working with students during office hours. It is among the most rewarding things I get to do as an instructor, so please take advantage. If a scheduling conflict prevents you from attending my office hours, I will be happy to schedule a time with you. In addition to my office hours, your TA will also hold office hours.

*Econ Tutoring Lab:* The Economics department provides a free tutoring lab. Information can be found on the department's website:
https://www.colorado.edu/economics/undergraduate-program

*Private Tutors:* Private tutors are available for a fee. Information can be found on the department's website: https://www.colorado.edu/economics/undergraduate-program

There is a strong correlation between attendance and homework with a student's overall grade. The correlation coefficients are greater than 0.60. I would be remiss if I did not note that correlation does not imply causation. Nonetheless, imitating the approach of successful students is not a bad strategy. Take this course seriously. Use the available resources. Keep up with the course and do not fall behind.

**Communication Policy**

Email will be my primary form of communication with the class:

- I will use your CU email address for class communications, so check your CU mailbox frequently.
- I will answer you as soon as possible. Please allow 24 hours for a response.
- Please refer to the syllabus to answer questions, before contacting me.
- Questions on course material are often more easily and thoroughly answered in person. Please use my office hours as your primary means of obtaining help with course material.
- Under no circumstances can I provide grades through email due to Family Educational Rights and Privacy Act (FERPA) regulations, since emails are not considered secure. Grades will be available on Canvas when available.

**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.

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, please alert me as soon as possible so that I'm aware of your situation and can accommodate you as best as possible.**

**Disability Accommodations**

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. **You must provide me with your disability letter and contact me to make suitable arrangements at least two weeks prior to any exam.** 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 Policy**

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.

**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.

**Religious Observance Policy**

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, please contact me at the beginning of the term so we can make proper arrangements.

**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.

**Tentative Course Schedule**:

- R exercises and homework are due Sundays before 11:59 PM unless otherwise announced (No Exceptions)

| Week | Tentative Course Outline | Due Dates |
|---|---|---|
| Week 1 (Jan 14-15) | • Introduction | • None |
| Week 2 (Jan 18-22) | • Martin Luther King Day – No Class (Jan 18th)<br>• Chapter 1 Picturing Distributions with Graphs<br>• Chapter 2 Describing Distribution with Numbers | • HW1 |
| Week 3 (Jan 25-29) | • R Day<br>• Chapter 12 Introduction to Probability<br>• Chapter 13 General Rules of Probability | • HW2<br>• Q1 |
| Week 4 (Feb 1-5) | • Chapter 14 Binomial Distributions<br>• Chapter 3 The Normal Distributions<br>• R Day | • R1<br>• HW3<br>• Q2 |
| Week 5 (Feb 8-12) | • Distribution<br>• Expectation<br>• Variance | • R2<br>• Q3 |
| Week 6 (Feb 15-19) | • Wellness Day – No Class (Feb 17th)<br>• Chapter 8 Producing Data: Sampling<br>• Chapter 9 Producing Data: Experiments | • HW4<br>• Q4 |
| Week 7 (Feb 22-26) | • **Midterm 1**<br>• Chapter 15 Sampling Distributions | • None |
| Week 8 (Mar 1-5) | • Estimation<br>• Chapter 16 Confidence Intervals: The Basics | • HW5 |
| Week 9 (Mar 8-12) | • Chapter 17 Tests of Significance: The Basics<br>• R Day | • HW6<br>• Q5 |
| Week 10 (Mar 15-19) | • Chapter 18 Inference in Practice<br>• Chapter 20 Inference about a population mean | • R3<br>• HW7<br>• Q6 |
| Week 11 (Mar 22-26) | • Chapter 21 Comparing Two Means<br>• Wellness Day – No Class (Mar 25th) | • None<br>• Q7 |
| Week 12 (Mar 29-Apr 2) | • **Midterm 2**<br>• R Day | • None |
| Week 13 (Apr 5-9) | • Chapter 4 Scatter Plots<br>• Chapter 6 Two Way Tables | • R4<br>• HW8 |
| Week 14 (Apr 12-16) | • Chapter 5 Regressions<br>• Chapter 26 Inference for Regressions | • HW9<br>• R Project<br>• Q8 |
| Week 15 (Apr 19-23) | • Chapter 26 Inference for Regressions<br>• R Day | • HW10<br>• Q9 |
| Week 16 (Apr 26-30) | • Review<br>• Reading Day – No Class (Apr 30th) | • R5<br>• Q10 |