

ECONOMICS 3818-040
Introduction to Statistics with Computer Applications
Spring 2019
TuTh, 2:00-3:15pm, HLMS 211

Instructor: Matthew Ridge Butner

Office: Econ 401

Office Hours: Wednesday 2:00 - 4:00pm

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Webpage: Desire to Learn & <https://mattbutner.github.io>

"Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write."
-Samuel S. Wilks (1950) misquoting H.G. Wells (1903)

Course Description:

Statistical literacy is one of the most valuable skills you can learn. This course will give you the theoretical foundation to study and understand statistics with the ultimate goal to prepare you for econometrics. We will start talking about types of data, probability rules and distributions, and sampling methods before midterm one. Midterm two will focus on inference from a sample including sampling distributions, estimation, confidence intervals and hypothesis testing. Before the cumulative final we will briefly discuss additional hypothesis tests and the basics of regression analysis.

Course Website:

Lecture slides, practice exam material, supplemental notes, and R exercises will be posted on the Desire to Learn course page. Data for computer applications will be hosted on my personal webpage. Homework will be completed through Sapling Learning.

Prerequisites:

Econ 2010 & 2020 & (Econ 1088 or Math 1081 or Math 1300 or Math 1310 or Appm 1350)
This course will use algebra (summation notation) and calculus (a few integrals)

Textbook:

The Basic Practice of Statistics, Eighth Edition, by Moore, Notz, and Fligner.
Macmillian Learning, ISBN-10: 1-319-04257-0

Other Resources:

Take advantage of office hours held by the TA and instructor. Online resources are plentiful. The economics department has a public tutoring lab where graduate students will help for free. The hours are available here: <http://www.colorado.edu/Economics/undergraduate/tutorial-lab.pdf>. Additionally, the economic department provides a list of graduate students available for private tutoring at various rates: http://www.colorado.edu/Economics/undergraduate/tutor_list.pdf. Be aware there is no quality guarantee. If you prefer an additional perspective, I recommend the open source text book "[OpenIntro Statistics](#)"

Computer Application:

R is a free programming language available on mac, windows, and unix operating systems. It is pre-installed on most University computer labs and downloadable from the internet. Every other week or so we will spend time in class to work on R exercises through the R studio interface. We will do a brief introduction in class Thursday January 17th, but you are responsible for knowing the language syntax otherwise. Thankfully R has fantastic documentation in the base installation.

If you'd like another resource, Bruno Rodrigues has a free book on Modern R:

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

Course Components:

Your grade will be determined through four measures with the following weights:

Exams: 70% Sapling Homework: 10% R exercises: 10% Recitation: 10%

Exams: Two midterms (20% each) and a cumulative final (30%). They will be predominately multiple choice with a few free response questions. If necessary, a curve will be applied on each exam. You are allowed a 3 by 5 index card of hand written notes, front and back, for reference during the exam.

Sapling Homework: There will be a brief problem set assignment every week. It will be due on Sunday at Midnight. Due dates will be visible through Sapling, and announced in class, however you are responsible for knowing when homework is due. Late homework will not be accepted. Your lowest homework grade will be dropped. **Sapling is required.** Use `butner` as the enrollment key.

R exercises: There will be five simple assignments for you to complete in R and one project. We will work on each one in class before the assignment is due. The project will involve you manipulating and visualizing a data set I choose. Each assignment, and the project, will be 2% of your overall grade, with the lowest assignment grade being dropped.

Recitation: This is a four credit course. Recitation attendance is mandatory. Your TA is responsible for your recitation grade. The TA for recitation is PhD student **Kas McLean**. There is no recitation the first week of the semester. Recitation times and meeting locations are as below. Make sure you attend the correct recitation. **Kas will announce her office hours.**

Section	Day of week	Time	Room
041	Tu	5:00 - 5:50 pm	ECON 119
042	Th	3:30 - 4:20 pm	MCOL E186

Extra Credit: The **only** extra credit opportunity is through iClicker questions during lecture. A maximum of five percentage points will be added to your grade for excellent clicker participation. You must register your iClicker to receive credit. <http://www.colorado.edu/oit/tutorial/cuclickers-iclicker-remote-registration>

Final Grade Calculation:

Your final grade, out of one hundred percent, will be rounded to the nearest tenth. You'll receive the highest letter grade for which your percentage grade is equal to or greater than the corresponding number.

93:A | 90:A- | 87:B+ | 83:B | 80:B- | 77:C+ | 73:C | 70:C- | 50:D | 0:F

Policies:

- There will be **no make-up examinations** unless appropriate documentation is provided.
- There will be **no late homework** accepted under any condition.
- If you miss class on 1/15, 1/17, **you can be dropped from the course.**
- Feel free to use your laptop or tablet during lecture for course related activities (notetaking, calculations). It is obvious if you are using the resource for some other purpose. If suspect, you will be asked to leave. No questions asked.
- You will not be allowed to use R during an exam. It is suggested you obtain and familiarize yourself with a basic calculator. Statistical calculators are allowed.
- If I can help you with an accommodation, please let me know two weeks before the examination.
- This course adheres to all campus policies regarding disabilities, religious observances, appropriate behavior, discrimination and harassment, and academic conduct. See <http://www.colorado.edu/policies/>

Communication:

My colorado.edu email address is the best way to contact me. I will announce important dates, and course updates, through email. Be sure to check your email to stay up to date in the course.

Tentative timeline:

Subject to change at the instructor's discretion.

All chapter numbers refer to Moore et. al. eighth edition.

Week 1 – 1/14	Chapters 1, 2. Population v. sample, introduction to R.
Week 2 – 1/21	Chapters 12, 13. Probability problems.
Week 3 – 1/28	Chapter 14. Binomial Distribution.
Week 4 – 2/4	Chapter 3. Normal Distribution.
Week 5 – 2/11	Other distribution, Mathematical expectation.
Week 6 – 2/18	Midterm 1
Week 7 – 2/25	Chapter 15. Sampling Distributions. Properties of Estimators.
Week 7 – 2/25	Central Limit Theorem, Law of Large Numbers.
Week 8 – 3/4	Chapter 16. Confidence intervals.
Week 9 – 3/11	Chapters 17, 18. Test of significance, Inference in Practice.
Week 10 – 3/18	Handling data, Midterm 2.
Week N/A – 3/25	Spring Break
Week 11 – 4/1	Chapter 20, Inference about the mean.
Week 12 – 4/8	Chapter 21. Inference about two means.
Week 13 – 4/15	Chapters 22, 23. Proportions.
Week 14 – 4/22	Chapters 5, 26. Correlation and regression analysis.
Week 15 – 4/29	Chapter 26, review
Final – TBD	

Important dates:

Homework is due most Sundays!

Clicker questions every class period!

These dates are tentative!

- 1/14 – First day of class
- 1/24 – R exercise 1 due
- 2/5 – R exercise 2 due
- 2/12 – Midterm 1
- 3/5 – R exercise 3 due
- 3/21 – Midterm 2
- 3/25 – Fall Break Begins
- 3/20 – Fall Break Ends
- 4/4 – R exercise 4 due
- 4/18 – R data project due
- 4/30 – R exercise 5 due
- ?? – Final exam