BUSN 5000
Introduction to Data Science for Business and Economics

Ian Schmutte Chris Cornwell

Spring 2022

Class Room: Ivester E007 Class Hours: TR, 935a and 1110a

Instructors

Contact	*Ian Schmutte*	*Chris Cornwell*
email	schmutte@uga.edu	cornwl@uga.edu
web	ianschmutte.org	cornwl.github.io
office	Amos B420	Amos B463
hours	TBA	W, 100-300

Teaching Assistants

Contact	*Kristin Casella*	*Cole Wittbrodt*
email	kristin.casella@uga.edu	cole.wittbrodt@uga.edu
office	Ivester E111	Ivester E111
hours	TBA	TBA

Course Description

The modern world is awash in a seemingly unlimited amount of data. To harness these data for decisions starts with acquiring the raw information and ends with a report describing the outcome of some analysis. At each step, the analyst combines data with some ideas about how the world works to produce an output. BUSN 5000 will take a hands-on approach, with a focus on techniques of data preparation; descriptive, explanatory and predictive analyses; and scientific communication.

Course Objectives

After completing this course, you should understand

1. how social, economic, and business data are produced from different sorts of information.
2. how to produce replicable, properly curated research results based on confidential and public-use data files.
3. how to map economic models, business problems, and policy questions to hypotheses about relationships in data.
4. the basic concepts of causal inference and how to implement basic research designs to facilitate causal inference.
5. the basic concepts of statistical learning and how to implement them to make predictions about economic, business or policy outcomes.
6. how to obtain data and prepare it for analysis.
7. how to describe data and perform basic descriptive, explanatory and predictive analyses.
8. how to communicate the results from descriptive, explanatory and predictive analyses.

Recommended Texts

There are no required texts for this course, but many useful ones. Here is a curated list where you can find the course content covered at an "age-appropriate" level:

- *Beginner*

  Bueno de Mequita, E. and Fowler, A. *Thinking Clearly with Data*, Princeton University Press.

  Çetinkaya-Rundel, R., *Data Science in Box*.

  Healy, K., *Data Visualization: A Practical Introduction*, Princeton University Press.

- *Next Level*

  Angrist, J. and Pischke, S., *Mastering 'Metrics*, Princeton University Press.

  Cunningham, S., *Causal Inference: The Mixtape*, Yale University Press.

  Schwabish, J., *Better Data Visualizations*, Columbia University Press.

There are many excellent purely online resources to get a statistics refresher with some R programming tossed in. At the beginner level, we recommend *Computational and Inferential Thinking: The Foundations of Data Science*, *R for Data Science* and *Learning Statistics with R*. You will find a more advanced treatment in *Foundations of Statistics with R*.

Software

The software of choice for this class is R, a free and open-source language for statistical computing and graphics. RStudio is a popular integrated development environment (IDE) for R that will greatly enhance your R experience. First, download and install R; then download and install RStudio. Follow these instructions.

Terry Analytics Lab

The TAL is a resource supported by the Department of Economics for all Terry students enrolled in business analytics and econometrics courses. The lab is managed by Robyn Anzulis

(robyn.anzulis@uga.edu). Her team provides free tutoring in course concepts and R coding. TAL will operate from early/mid afternoon to early evening, Mon-Thu, beginning the second week of the semester. The TAs for this course are experienced TAL staff members with a dedicated assignment to BUSN 5000 students. We strongly encourage you to seek their assistance as you work on homework assignments and prepare for exams. TAL has its own eLC course page to which you will be subscribed.

Course Policies

Electronic devices

Cell phones *must* be muted or turned off and stowed away during class. Laptops may be used in class, but only for purposes directly related to the course (e.g., taking notes, live coding and viewing course materials).

Attendance

Regular class attendance is essential for success and therefore strongly encouraged. There will be no explicit penalty assessed for missing class, but repeated absences will send a clear negative signal. All instruction will be fully in-person. Class lectures and discussion will not be recorded.

Communication

The best way to contact us is via email. Please send your message from your UGA address to ours. Do not use the email facility within eLC to send messages to us because they cannot be replied to directly.

We are also available for Zoom meetings, but you should make an appointment via email.

Our communications to the class will generally come through the eLC Announcements tool, which functions like an instant messaging system. You should set your notifications preferences to receive Announcements postings in the manner that suits you. We strongly encourage the SMS option.

Performance evaluation

Your performance will be evaluated on the basis of 10 homework assignments and 2 exams weighted as follows:

Part	Assessment	Number	Weight	Total
I	Homework	5	.05	.25
	Exam	1	.25	.25
II	Homework	5	.05	.25
	Exam	1	.25	.25

You will be ranked relative to other students in the class according to your overall performance and grades assigned based on your class rank. We will use the plus/minus system to make distinctions within grade categories.

Topical Outline

The topical outlines for parts I and II of the course are provided below. Follow the links to class schedules with reading assignments.

Part I [class schedule with reading assignments]

1. Reproducible data analysis
2. Documenting data and review of basic statistics
3. The Bayesian approach to learning from data
4. Linking theory and measurement
5. Sources of data error
6. Data ethics

Part II [class schedule with reading assignments]

1. Correlation, causation and prediction
2. The CEF and regression estimation
3. Sampling distributions and inference
4. Potential outcomes and causal inference
5. Difference in differences
6. Regression discontinuity
7. Prediction with regression
8. Introduction to machine learning

Other Course Policies and Statements

UGA student Honor Code

"I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others." A Culture of Honesty, the University's policy and procedures for handling cases of suspected dishonesty, can be found at https://www.uga.edu/ovpi. Every course syllabus should include the instructor's expectations related to academic honesty.

Mental health and wellness resources

If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit https://sco.uga.edu. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.

UGA has several resources for a student seeking mental health services (https://www.uhs.uga.edu/bewelluga/bewelluga) or crisis support (https://www.uhs.uga.edu/info/emergencies).

If you need help managing stress anxiety, relationships, etc., please visit BeWellUGA (https://www.uhs.uga.edu/bewelluga/bewelluga) for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center.

Additional resources can be accessed through the UGA App.

Diversity, equity and inclusion

The Terry College is committed to promoting diversity, equity, inclusion, and belonging among its students, faculty, and staff. This class welcomes the open exchange of ideas and values freedom of thought and expression. This class provides a professional environment that recognizes the inherent worth of every person. It aims to foster dignity, understanding, and mutual respect among all individuals in the class.

Coronavirus information for students

UGA adheres to guidance from the University System of Georgia and the recommendations from Georgia Department of Public Health (DPH) related to quarantine and isolation. Since this may be updated periodically, we encourage you to review the latest guidance here. The following information is based on guidance last updated on December 29, 2021.

Face coverings Following guidance from the University System of Georgia, face coverings are recommended for all individuals while inside campus facilities.

How can I obtain the COVID-19 vaccine? University Health Center is scheduling appointments for students through the UHC Patient Portal (https://patientportal.uhs.uga.edu/login_dualauthentication.aspx). Learn more here – https://www.uhs.uga.edu/healthtopics/covid-vaccine.

The Georgia Department of Health, pharmacy chains and local providers also offer the COVID-19 vaccine at no cost to you. To find a COVID-19 vaccination location near you, please go to: https://georgia.gov/covid-vaccine.

In addition, the University System of Georgia has made COVID-19 vaccines available at 15 campuses statewide and you can locate one here: https://www.usg.edu/vaccination

What do I do if I have COVID-19 symptoms? Students showing COVID-19 symptoms should self-isolate and get tested. You can schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5p.m.). Please DO NOT walk-in. For emergencies and after-hours care, see https://www.uhs.uga.edu/info/emergencies.

What do I do if I test positive for COVID-19? (Isolation guidance) If you test positive for COVID-19 at any time, either through a PCR test, an Antigen test, or a home test kit, you are required to report it through the DawgCheck Test Reporting Survey. Follow the instructions provided to you when you report your positive test result in DawgCheck.

As of December 29, 2021, when an individual receive a positive COVID-19 test: Everyone, regardless of vaccination status, should:

- Stay home for 5 days.
- If you have symptoms or your symptoms are resolving after 5 days, you can leave your house and return to class.
- Continue to wear a mask around others for 5 additional days.

What do I do if I have been exposed to COVID-19? (Quarantine guidance) If you have been exposed (within 6 feet for a cumulative total of 15 minutes or more over a 24-hour period – unmasked) to someone with COVID-19 or to someone with a positive COVID-19 test and you are:

- Boosted, or have become fully vaccinated within the last 6 months (Moderna or Pfizer vaccine) or within the last 2 months (J&J vaccine)

  - You do not need to quarantine at home and may come to class.
  - You should wear a mask around others for 10 days.
  - If possible, get tested on day 5.
  - If you develop symptoms, get tested and isolate at home until test results are received, then proceed in accordance with the test results.

- Unvaccinated, or became fully vaccinated more than 6 months ago (Moderna or Pfizer vaccine) or more than 2 months ago (J&J vaccine) and have not received a booster:

  - You must quarantine at home for 5 days. After that you may return to class but continue to wear a mask around others for 5 additional days.
  - If possible, get tested on day 5.
  - If you develop symptoms, get tested and isolate at home until test results are received, then proceed in accordance with the test results.

"Masked-to-masked" encounters are not currently considered an exposure; this type of interaction would not warrant quarantine.

You should report the need to quarantine on DawgCheck (https://dawgcheck.uga.edu/), and communicate directly with your faculty to coordinate your coursework while in quarantine. If you need additional help, reach out to Student Care and Outreach (sco@uga.edu) for assistance.

Monitoring conditions*: Note that the guidance referenced in this syllabus is subject to change based on recommendations from the Georgia Department of Public Health, the University System of Georgia, or the Governor's Office. For the latest on UGA policy, you can visit coronavirus.uga.edu.

Changes to the syllabus

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.