

BUSN 5000

Introduction to Data Science for Business and Economics

Chris Cornwell

Spring 2023
(updated 15 Aug 23)

Class Room: Amos B010

Class Hours: TR, 935a and 1110a

Teaching Team

Instructor

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Teaching Assistants

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| Contact | Abbi Cormier | Morgan Kearns |
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| office | Amos B458 | Amos B413 |
| hours | T, 200-330 | by appt |

Abbi is the lead TA and the primary contact for questions about the course administration and assessments. Morgan is the recitation leader and will be conducting regular sessions to give students an opportunity outside of class to revisit the course material and ask questions.

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 result of some analysis. At each stage of the value chain, the analyst combines data with 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 to acquire data and prepare it for analysis.
2. how to design reproducible data analyses.
3. how to map economic models, business problems, and policy questions to hypotheses about relationships in data.
4. how to describe data and perform basic descriptive analysis.
5. the fundamental concepts of causal inference and how to carry out basic causal analysis.
6. the fundamental concepts of machine learning and how to carry out basic predictive analysis.
7. how to communicate the results from descriptive, causal and predictive analyses.

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. A detailed course schedule is posted on eLC and also viewable [here](#).

Part I :: Transformation to Analysis

1. Data fundamentals
2. Beginning to learn
3. Models for exploration
4. Making inferences
5. Measurement error and sample selection
6. Bayesian approach to learning from data
7. Data ethics

Part II :: Explaining and Predicting

1. Regression fundamentals
2. Potential outcomes and causal inference
3. Regression discontinuity
4. Difference in differences
5. Prediction with regression
6. Introduction to machine learning

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. We highly recommend the “Gabors” book for this class.

- *Beginner*

Bueno de Mesquita, 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.

- *Intermediate*

Bekes, G. and Kedzi, G., *Data Analysis for Business, Economics, and Policy*, Cambridge University Press.

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

- *Next Level*

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 *Taylor Gorak* (taylor.gorak@uga.edu). Her team provides free tutoring in course concepts and R coding. TAL typically operates from early/mid afternoon to early evening, Mon-Thu, beginning the second week of the semester. You should regard TAL as the first stop for help with course assignments and coding assistance. 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).

Communication

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. Regardless, you are responsible for information conveyed in the announcements.

All questions about course administration and assessment should first be directed to Abbi. If she is unable to resolve the issue, I will be happy to intervene.

Performance evaluation

Your performance will be evaluated on the basis of homework assignments, Dailies, projects and a final exam weighted as follows:

| Assessment | Number | Total |
|------------|--------|-------|
| Dailies | | 10% |
| Homework | 10 | 30% |
| Project | 2 | 30% |
| Test | 2 | 30% |

Dailies

Dailies are short active-learning exercises that we will conduct each class period. You will earn Dailies points by participating and providing correct responses. Your overall Dailies score will be the percentage of total potential Dailies points you earned. *If you are absent from class you cannot participate in the Daily.* (This probably goes without saying, but just in case: participating in Dailies on behalf of students who are absent from class constitutes an academic honesty violation and will be prosecuted as such.) We will drop the 4 lowest Dailies scores.

Homework

Homework assignments are *formative* graded tutorials that guide you through the key concepts in each course topic and include an empirical component.

In the final evaluation of your performance, we will count only the 8/10 highest homework scores. The policy of dropping the 2 lowest scores should accommodate the unforeseen events that may prevent you from completing a homework assignment in a particular week. Relatedly, it allows us to take a hard line on submission deadlines: *late homework submissions will not be accepted.*

Homework assignments are delivered as a Shiny app running in the cloud. We have posted a video explaining the process of submission on eLC. Watch it and then watch it again. We won't have too much patience for submission fails.

Projects

The projects are *summative* assignments covering the material in each part and include an extended empirical exercise in a notebook-style deliverable. The project is to be completed individually and without collaboration with ANY other students. However, you may consult TAL staff or the TAs for assistance regarding knitting the project assets into the required notebook document. For your submission to be acceptable, it must be in PDF format and contain a signed academic honesty statement. *Project submissions that are in the wrong format, omit the signed academic honesty statement, or miss the submission deadline will not be accepted.*

Tests

The tests are *summative* assessments of the key concepts covered in each section of the course. We believe real mastery of the course material is demonstrated by high performance on both formative and summative assessments.

The tests will be held in class, the first on **Oct 5** and the second during the final exam period according to each section's [prescribed date and time](#). The 930 section will take the second test on **Dec 12 at 800a** and the 1110 section will take the test on **Dec 7 at 1200p**. You must take the second test on the date for your section.

Final grade assignment

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.

Attendance

Regular class attendance is essential for success and therefore strongly encouraged. There is no explicit penalty assessed for missing class, but missing class means missing a Daily, which could be costly. In any event, repeated absences will send a clear negative signal. Class lectures and discussion will not be recorded.

Generative AI

Our view is that generative AI (ChatGPT, Claude, Bard, etc) is productivity-enhancing tool and you should learn to use it in this course and in life. Cutting and pasting AI generated output into course assignments is not the way to learn though.

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>.

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 and inclusive excellence

The Terry College of Business is committed to promoting an inclusive learning and working environment among its students, faculty, and staff. This class welcomes the open exchange of ideas

and values freedom of thought and expression and 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.

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.