Data Science for Economics and Policy
Spring 2023

Class Time: Tuesday/Thursday, 11:00a-12:30p
Classroom: CBA 2.564
TA session: Friday, 9:00a-10:30a, CBA 4.342
Course webpage link: Data-Science-for-Economics-and-Policy

Instructor: David Puelz
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Office: CBA 6.444
Office hours: Tuesday (my office) and Wednesday (Zoom), 12:30p-1:30p

Course Description and Objectives

Data Science for Economics and Policy is a semester-long course in statistics and data science to learn the tools necessary for policy, economics, and social science research. In parallel, the students will apply these tools to real-world data and answer crucial policy questions. Policy research is important, and appropriately using data, cutting-edge statistical tools and remaining skeptical are equally important. Students can expect to leave this class with a deep understanding of policy questions and a toolbox for evaluating them.

Required Textbooks

Quantitative Social Science (QSS) – Kosuke Imai

Mastering 'Metrics (MM) – Joshua Angrist et al.

Homework

Exercises will be assigned each Monday and due the following Tuesday. Please submit a pdf knitted from an `Rmarkdown` file with your solutions to canvas. The exercises will be graded on a scale from 1 to 5. The grading criteria are:

- Did you make an honest, concerted attempt at each problem?
- Did you attempt to address all parts of the question?
- Did you include enough detail on what you actually did so that a well-informed reader could understand your analysis in detail? (You won't receive full credit if it's not clear what steps you actually took in your analysis.)
- Did you include properly annotated figures/tables where appropriate?
- Did you write up your solution professionally, with an actual narrative flow (good), or did you just copy and paste a bunch of `R` code without much in the way of explanation (bad)?
- Did you use sensible procedures to answer a given question?
- Did you make any significant technical mistakes?

Research Project

There will be a final research project where groups of up to three students analyze their own data on an economics or policy relevant topic. In both cases, groups should talk with me on ideas and settle on a novel data analysis idea by **March 21** – please send me an email on this date with a summary of the proposed project. The deliverables will be a brief class presentation (15 minutes) of research findings as well as a comprehensive write-up. The write-up should be structured like an academic paper. More details about expectations and grading criteria for the research projects will be provided later in the semester.

Evaluation

The class grade is comprised of the following:
– Homework (20%). Lowest one is dropped.
– Midterm (30%)
– Research Project (40%)
– Engagement (10%). How often did you participate in class and contribute to class discussion?

Important Notes

→ *Attendance and participation*: This is an advanced elective class, and I expect full participation and attendance. If you choose to not attend class time without advanced notice, I reserve the right to remove you from the course.
→ *Grade curving*: I will not curve the midterm, so please study hard for it! A poor midterm grade will dramatically increase the chances of a poor final course grade. I reserve the right to curve the final course grades. I will not implement a curve that will negatively impact your final grade.
→ *Deadlines*: If you fail to turn in homeworks or projects by the deadlines, you will automatically receive a zero, no exceptions.
→ *Group projects*: Equal contribution of group members is crucial for learning and success. At any point during the semester up until the week before project presentations, group members have the right to "fire," i.e., remove from the group a member for not adequately contributing. Those firing must notify me and the student in writing, and the fired student must complete the project on their own or with other fired students. For groups of 3, majority is needed to fire. For groups of 2, the aggrieved student can propose a grade deduction for the offending student (in percentage terms, e.g., 30% off their project grade) in writing to me for consideration.

Topics and Timing

Below is a timeline for the semester. It is subject to change as we make our way through these topics. Please also pay attention to the course website. I will include supplemental readings beyond those in our textbooks.

Date	**Topics**	**Reading**
Week 1: Jan 10 / Jan 12	Intro & `R`	QSS 1.3-1.4
Week 2: Jan 17 / Jan 19	`R` + Causality	QSS 2.1-2.3, MM Intro
Week 3: Jan 24 / Jan 26	Causality	QSS 2.4-2.7, MM 1.1
Week 4: Jan 31 / Feb 2	Probability	QSS 6.1-6.3
Week 5: Feb 7 / Feb 9	Probability + Prediction	QSS 4.1
Week 6: Feb 14 / Feb 16	Prediction	QSS 4.2, MM 2.1
Week 7: Feb 21 / Feb 23	Prediction	QSS 4.3, MM 2.2
Week 8: Feb 28 / Mar 2	Unsupervised learning (clustering)	QSS 3.7
Week 9: Mar 7 / Mar 9	Unsupervised learning (PCA) + **midterm**	see website
Week 10 *(Spring break)*		–
Week 11: Mar 21 / Mar 23	Unsupervised learning (networks)	QSS 5.2
Week 12: Mar 28 / Mar 30	Unsupervised learning (text)	QSS 5.1
Week 13: Apr 4 / Apr 6	Heterogeneous causal effects	see website
Week 14: Apr 11 / Apr 13	How to do research + Project presentations	see website
Week 15: Apr 18 / Apr 20	Project presentations	–

Students with Disabilities

Upon request, the University of Texas at Austin provides appropriate academic accommodations for qualified students with disabilities. Services for Students with Disabilities (SSD) is housed in the Office of the Dean of Students, located on the fourth floor of the Student Services Building. Information on how to register, downloadable forms, including guidelines for documentation, accommodation request letters, and releases of information are available online at here. Please do not hesitate to contact SSD at (512) 471-6259, VP: (512) 232-2937 or via e-mail if you have any questions.

Harassment Reporting Requirements

Senate Bill 212 (SB 212), which went into effect as of January 1, 2020, is a Texas State Law that requires all employees (both faculty and staff) at a public or private post-secondary institution to promptly report any knowledge of any incidents of sexual assault, sexual harassment, dating violence, or stalking "committed by or against a person who was a student enrolled at or an employee of the institution at the time of the incident." Please note that both the instructor and the TA for this class are classified by SB 212 as mandatory reporters. That means we MUST share with the Title IX office any information about sexual harassment/assault that is shared with us by a student-whether in-person, via electronic communication, or as part of any class assignment. Note that a report to the Title IX office does not obligate a victim to take any action, but this type of information CANNOT be kept strictly confidential except when shared with designated "confidential employees." A confidential employee is someone a student can go to and talk about a Title IX matter without triggering any obligation by that employee to have to report the situation so that it will be investigated. A list of confidential employees is available on the Title IX website. The professor and TA for this class are NOT designated confidential employees per SB 212.