Election Data Science

Prof. Michael McDonald

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Course Overview

Campaign consultants since the late 1960s analyzed and visualized large-scale databases in the areas of redistricting, campaign finance, and voting. The latter was popularized by the Obama campaign's large-scale microtargeting efforts in 2008. Recent years have seen yet another transformation of election consulting and journalism with the advent of analysis and visualization of election data. Popularized by organizations like 538, data analytics have become a routine part of how the public consumes election information.

Course Objectives

The goals of this class is to learn the properties of election data, how to analyze it, and how to visualize it. While we focus on election data, job applicants who have the analytics skills we will cover in this class are in high demand. We will primarily use a programming language called R. If you don't already have it, it is freely available at https://www.r-project.org/. You may also wish to download a popular program that provides a user interface called R Studio, which is also freely available at https://www.rstudio.com/. Along the way to learning how to use R, we will apply programing tasks to real-world election examples.

Alumni of this class have provided their class project as work product examples, which have helped them in securing a job upon graduation. I expect that the analysis and visualization skills you learn here will assist you in your future careers in politics or data science.

Course Materials

- Hadley Wickham and Garrett Grolemund, 2nd edition. 2023. *R for Data Science*. Sebastopol, CA: O'Reilly Media Inc.
- Kieran Healy. 2018. *Data Visualization: A Practical Introduction*. Princeton University Press.
- Additional readings are available online on Canvas.

You do not need to purchase a textbook! I find having a hard copy sometimes useful, but having one is not necessary. Free online versions of the textbooks are available through the links provided.

The readings that will be discussed each class are listed below as a <u>Reading Assignment</u> for that day of class.

Additional Academic Resources

- <u>Career Connections Center</u>: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.
- <u>Library Support</u>: Various ways to receive assistance with respect to using the libraries or finding resources.
- <u>Teaching Center</u>: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring.
- <u>Writing Studio</u>: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
- Student Complaints On-Campus: <u>Visit the Student Honor Code and Student Conduct Code webpage for more information</u>.
- On-Line Students Complaints: <u>View the Distance Learning Student Complaint Process</u>
- Enrollment Management Complaints (Registrar, Financial Aid, Admissions): <u>View the Student Complaint Procedure webpage for more information.</u>

Attendance Policy

If you do not participate in at least one of the first two class meetings of a course or laboratory in which you are registered, and you have not contacted the professor to indicate your intent, you can be dropped from the course. You must not assume that you will be dropped, however. The department will not notify you if you have been dropped from a course or laboratory. You can request reinstatement on a space-available basis if you present documented evidence of your absences.

The university recognizes the right of the individual professor to make attendance mandatory. After due warning, professors can prohibit further attendance and subsequently assign a failing grade for excessive absences.

For more information on the university's attendance policies, see <u>here</u>.

In my experience, students who fail to attend class tend to have a personal problem affecting their performance. If you're struggling, please contact the instructor so we can devise a plan together. The university provides <u>resources to students in distress</u> that I encourage you to seek out.

The policy for this class is that every student should make the best attempt to attend all classes. A student that misses four or more classes without a university-approved excuse (e.g., from the Dean's office, sports department, or other university official) will

have their overall grade reduced a letter step (e.g., B+ to B). Students do not need, and should not approach the professor, to provide non-university-approved excuses for missing three or fewer classes. A student with ten or more unexcused class absences will receive a failing grade for the entire course and will be barred from attending further classes.

If you are late to class the instructor may not credit your presence as attending. This penalty is usually invoked for chronic tardiness and is usually preceded by a warning.

If there is an issue that affects your ability to attend class, please let the professor know as soon as possible. Accommodation can be made if we devise a plan together as soon as a problem occurs.

Grades

Grades consist of a class project and workshops to track your progress. The weighting of the aspects of the grade are:

Assignment	Due	% of Overall Grade
Class Project		
Proposal	Sept. 26	10%
Final Submission	Dec. 9	80%
Workshops	Various	10%

Class Project Proposal (10% of overall grade): A two-page double-spaced summary of a student's proposed class project. The proposal accounts for 10% of the class grade. The primary purpose of the proposal is to ensure students devise a manageable class project. Students may be required to amend their proposal based on the feasibility of the proposed project.

Class Project (60% of overall grade): The final project is a website that includes an introduction, data analysis visualizations from techniques learned in class, and sample code. Students are encouraged to discuss challenges they encountered and their solutions.

Class Assignments

Proposal

You will write a one or two-page memo outlining your intended project. You must identify:

1. Why this is an interesting topic/question
2. The data you will analyze
3. What you expect to discover (i.e., a hypothesis)

Proposals are graded on:

- (40% of proposal grade) Why their topic is interesting and what they expect to discover (i.e., a question framed as a hypothesis)
- (30% of proposal grade) The data that will be analyzed and possible analysis approaches.
- (30% of proposal grade) professionalism of the proposal, e.g., spelling, grammar, and formatting.

Class Project

You will create a webpage describing your project, data visualization(s), code snippets and a description how you created your visualization(s), and a description of what the visualizations tell us. The webpage can be generated using R Markdown and publish to RPubs (https://rpubs.com/about/getting-started). You may publish to another platform if you wish to do so.

All students' class projects must be an original analysis of election administration data. Election administration data are data such as voter registration files, district or precinct boundary files, and precinct election results. These data do not include survey data, and projects analyzing survey data are inappropriate for the class project.

The following elements are considered for your project's grade:

- (25% of project grade) Overall narrative, which should incorporate text from the class project proposal. The narrative should explain how chosen visualizations address the research question. The narrative should include a discussion of findings and possible future research at the end.
- (50% of project grade) Students are graded on the appropriateness of their visualizations to their research project and class content, a description of the code required to generate the visualization, and any challenges that needed to be overcome. The types of required visualizations depend upon the student's research question and data. Typically, students are required to create a mapping visualization and line or bar charts.
- (25% of project grade) professionalism of the proposal, e.g., spelling, grammar, and formatting of text; clarity of sample code; labeling and aesthetics of visualizations.

Workshops

Throughout the semester, we will have workshops typically on Thursday classes. You will be given an assignment on Tuesday to complete by Thursday. These Thursday classes will be days where we collectively work through the problem in class. The assignment will be due that Thursday evening. Grades will be pass/fail for successful completion. Meaning, you can receive a grade of 100 or 0 for each completed assignment. A partially completed assignment counts as a fail or 0. There are six scheduled workshop assignments. You will be allowed to drop one from your grade calculation.

Grading Scale

Your number grade on assignments is converted to a letter grade using the following scale:

Percentage Earned	Letter Grade
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
Below 60	E

Your grade can be adjusted further for failure to adhere to the attendance and technology use policies.

Your class grade translates into university grade points. For more information please refer to university policies.

Policy Related to Make Up Exams or Other Work

Students are required to submit work when due. The due dates for workshops are the midnight of the assigned date. In most cases this provides students an opportunity to receive feedback in class before making a final submission. You are strongly encouraged to work on your workshop assignment before it is covered in class. Keep in mind that you may drop one workshop from your grade if you cannot complete it for any reason.

If students cannot complete assignments on the due date, they must notify the instructor in advance that they will be unable to do so. A proper remedy will be discussed given the circumstances of the tardiness. University-approved excuses, such as circumstances verified by the Dean of Students or athletic travel, typically receive no late grade penalty if the assignment is promptly completed by a new due date. Other failures may result in grade reductions or a failing grade.

Technology Use Policy

Laptops are welcome in the classroom since there is a programming element to the course. However electronic devices are to be used only for class-related activities. **Don't use cell phones and otherwise browse devices or laptops for non-class content.** A first offense of using electronic devices for other than approved uses earns

a warning. A second offense results in a full letter grade reduction of the overall class grade, and a third offense results in an automatic failing grade for the course.

Recordings

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited.

Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session. Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Honor Code

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor.

Basically, don't cheat. You cheat yourself of your education and more severe punishment may follow. Assisting someone else complete a project is cheating,

too. If you have any questions if your approach to completing an assignment may violate the honor code, please contact the instructor for guidance. This is true for any class.

Disability Statement

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester and present their accommodation letter to the instructor so we can devise a plan for your success.

Counseling and Student Health

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- *U Matter, We Care*: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.
- *Counseling and Wellness Center*: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.
- *Student Health Care Center*: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.
- *University Police Department*: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
- *UF Health Shands Emergency Room / Trauma Center*: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.
- *GatorWell Health Promotion Services*: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-2734450.

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

Policy Related to Guests Attending Class

Only registered students are permitted to attend class. However, we recognize that students who are caretakers may face occasional unexpected challenges creating attendance barriers. Therefore, by exception, a department chair or his or her designee

(e.g., instructors) may grant a student permission to bring a guest(s) for a total of two class sessions per semester. This is two sessions total across all courses. No further extensions will be granted. Please note that guests are **not** permitted to attend either cadaver or wet labs. Students are responsible for course material regardless of attendance. For additional information, please review the Classroom Guests of Students policy in its entirety. Link to full policy: https://phhp.ufl.edu/policy-classroom-guests-of-students/

Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Class Demeanor

Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Chronic tardiness is disrespectful. Please avoid the use of cell phones and restrict eating to outside of the classroom. Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all.

Inclusive Learning Environment

Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious and political values. We further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act."

Course Schedule

Week 1 **Aug 22**	**Thurs: Let's Get R-eady to R-umble!** <u>Reading</u> • Wickham and Grolemund Chapter 1. • Healy, Preface (follow installation instructions) I refer to the *R for Data Science* book by the authors' initials **WG** and the Healy book as **Healy**.
Week 2 **Aug 27 & 29**	**Tues: Making a Plot** • Healy Chapter 1, 2, 3 • WG Chapter 1 (Data visualization) **Thurs: Workshop**
Week 3 **Sept 3 & 5**	**Tues: R Programming Basics** <u>Reading</u> • WG Chapter 2 (Workflow: basics) • WG Chapter 3 (Data transformation) • WG Chapter 4 (Workflow: code style) **Thurs: Workshop**
Week 4 **Sept 10 & 12**	**Tues: Data Structures and Data Import** <u>Reading</u> • WG Chapter 5 (Data Tidying) • WG Chapter 6 (Workflow: scripts and projects) • WG Chapter 7 (Data import) **Thurs: Relational Databases** <u>Reading</u> • WG Chapter 13 (Joins)
Week 5 **Sept 17 & 19**	**Tues: Voter Registration Data** <u>Reading</u> • Gimpel, Dyck, and Shaw. 2007. "Election-Year Stimuli and the Timing of Registration." *Party Politics* 13(3): 351-74. (On Canvass) • https://www.brennancenter.org/blog/voter-purge-rates-remain-high-analysis-finds **Thurs: Little Errors and Big Data** <u>Reading</u> • Enrijeta Shino, Michael Martinez, Michael P. McDonald, and Daniel Smith. 2020. "Verifying Voter Registration Records: Part of Special Symposium on Election Sciences." *American Politics Research* 48(6): 677-81. • "Texas Audit Proposed by GOP Would Miss Minor But Real Errors." [Link]

Week 6 **Sept 24 & 26**	**Tues: Census Data** <u>Reading</u> • [TidyCensus package documentation](#) (it reads more like a primer on how to use the package) **Thurs: Workshop**
Week 7 **Oct 1 & 3**	**Tues: R Markdown and YAML** <u>Reading</u> • https://rmarkdown.rstudio.com/lesson-1.html (Recommend all the lessons) • https://learn-the-web.algonquindesign.ca/topics/markdown-yaml-cheat-sheet/#yaml **Thurs: Workshop**
Week 8 **Oct 8 & 9**	**Tues: Making Maps** <u>Reading</u> • Healy Chapter 7 **Thurs: Workshop**
Week 9 **Oct 15 & 17**	**Tues: Geocoding** <u>Reading</u> • Brian Amos and Michael P. McDonald. 2020. "A Method to Audit the Assignment of Voters to Districts." *Political Analysis* 28(3): 356-71. **Thurs: Workshop**
Week 10 **Oct 22 & 24**	**Tues: Parsing Strings** <u>Reading</u> • Hardcopy: Chapter 11 • Online: 14 Strings **Thurs: Workshop**
Week 11 **Oct 29 & 31**	**Tues: Exploratory Data Analysis & Difference-in-Difference** <u>Reading</u> • WG: Chapter 7 Exploratory Data Analysis • https://www.mailman.columbia.edu/research/population-health-methods/difference-difference-estimation • https://www.huffpost.com/entry/early-vote-election-eve-p_b_12853864 **Thurs: Campus Early Voting** <u>Reading</u> • Enrijeta Shino and Daniel A. Smith. 2020. "Mobilizing the Youth Vote? Early Voting on College Campuses." *Election Law Journal* 19(4): 524-541. (On Canvas)

Week 12 Nov 5 & 7	**Tues: Project Status Check** **Thurs: Project Status Check**
Week 13 Nov 12 & 14	**Tues: Ecological Inference** Reading • https://rpubs.com/rjb6233/ei **Thurs: Workshop**
Week 14 Nov 19 & 21	**Tues: Class Presentations** **Thurs: Class Presentations**
Week 15 Nov 26 & 28	**Thanksgiving Break**
Week 16 Dec 3	**Tues: Class Presentations** **Thurs: Reading Day**
Week 17 Dec 9	**Fri: FINAL EXAM @3-5pm** **(We will use this class for presentations, if needed)**