POL 286: Data Visualization for Consulting and Government
Fall 2024 (Syllabus Version: 3/17/2024)
Kirby Hall 109, M W 2:00p-3:15p

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Schedule an Office Hours Appointment: https://calendly.com/esareyje/office-hours

COURSE OBJECTIVES AND LEARNING OUTCOMES

This course seeks to help students create informative data visualizations, including interactive dashboards, useful for answering questions relevant to consulting and government.

Students will be able to:

1. understand and apply principles of sound data visualization;
2. create effective data visualizations using R/RStudio that answer substantively important questions; and
3. employ RShiny to create live interactive dashboards with data visualization.

GRADING POLICIES AND ASSIGNMENT DETAILS

Grade Components:

- Discussion Responses: 25%
- Small Group Discussion: 15%
- Final Project: 60%

Grading Scale:

100%-93%: A	82.9%-80%: B-	69.9%-67%: D+
92.9%-90%: A-	79.9%-77%: C+	66.9%-63%: D
89.9%-87%: B+	76.9%-73%: C	62.9%-60%: D-
86.9%-83%: B	72.9%-70%: C-	>59.5%: F

Small Group Discussion: Everyone in class will be randomly assigned to a small group. Each group must meet and discuss the discussion questions. Grading for this assignment is 100% or 0% based on attendance and active participation in the discussion. The grade will be assessed by your peers; after each meeting, your group will indicate on Canvas who meaningfully participated in the discussion and those who did so will receive full credit. Ten missed attendances for the Small Group Discussion will be dropped; the rest will be averaged to form this portion of the grade.

Discussion Responses: Discussion questions will be distributed in advance of each day's readings. At the beginning of class, a question will be randomly selected. All students will have ten minutes to write a response by hand. You are permitted to use your notes to assist you with these response questions, and I recommend that you use the small group discussion to workshop your ideas for this response. However, *each student must write their own response; a group cannot all submit identical responses.* Ten missed discussion responses will be dropped; the rest will be averaged to form this portion of the grade.

Attendance: Regular attendance is typically a prerequisite for success in the class, although no points are deducted on the basis of an absence alone. Anything taught in class is testable material, and not everything I teach in class will be in the course reading material.

Final Project: There will be a final project in this class. The project will consist of an interactive data visualization and short accompanying written description that asks and answers an important question. Students will need to give a short presentation describing their project in addition to the written and electronic materials at the end of the class (during finals week). The project will have interim completion milestones that students will complete over the course of the semester. A separate handout providing details of this project by Prof. Esarey.

ASSIGNMENT POLICIES

1. **Discussion responses and small group participation credits MAY NOT BE TAKEN LATE OR RESCHEDULED, including due to short-term illness or one-off academic or scholarly activities. Ten missed responses/group meetings, corresponding to over 35% of class meetings, are already dropped from the grade to account for these circumstances.** Exceptions to this policy will only be made in unusual circumstances on a case-by-case basis. If you develop a severe illness that you believe will interfere with your ability to complete more than a few discussion responses or small group discussions, please contact Dr. Esarey immediately.

2. **Discussion responses WILL NOT BE GRADED unless the student attends the full class period. If a student comes to class to complete the discussion response and then leaves, the response will not be graded.**

3. **Students are responsible for submitting working, uncorrupted files for all assignments.** If a file is corrupted and needs to be re-sent, and re-sending happens after the assignment deadline, a late penalty will be assessed.

4. **Project assignments are due at the date and time I specify for the assignment.** Late submissions will be marked off at 5 percentage points for the first hour late, and an additional 10 percentage points for every subsequent hour late.

5. **Project due dates** may be re-scheduled only under the following three circumstances:

   a. a death in the immediate family (parent, spouse, sibling, or child) within two weeks before the exam due date;
   b. an unforeseeable and significant illness or medical emergency affecting you, your spouse, or your child; or
   c. participation in a Wake Forest-sponsored academic or sporting event.

   In the event of (a) or (c), you must give me **at least 24 hours advance notice and preferably more** (via e-mail or a phone call) that you will miss the exam, or it may not be made up. I may require supporting documentation. All penalty waivers are at the discretion of the instructor. Under these circumstances, I will extend your due date and/or schedule you a make-up exam time. **Conflicts with a work schedule, job interview, non-academic trip, or vacation are not a valid reason to miss an exam or any other assignment** and cannot be the basis for a penalty waiver.

OTHER COURSE POLICIES

Honor Code/Academic Misconduct: All forms of academic misconduct will be handled according to the Wake Forest University Honor Code. Details on the Honor Code are available at https://studentconduct.wfu.edu/honor-system-wfu/.

If you ever have any questions about what you should do to stay within the honor code on a particular assignment, **contact me with your question and I can assist you**. I cannot guarantee a timely response unless you contact me at least 24 hours in advance of the time the assignment is due.

Statement on use of Artificial Intelligence Resources: Students must treat receiving assistance from artificially intelligent computer programs (such as ChatGPT or WolframAlpha) in the same way that they would treat receiving assistance from a human being. Any assistance that would be treated as a violation of the Honor Code if

performed by a person will be treated as a violation of the Honor Code if it is performed by a computer program. Some illustrative examples:

1. Uploading the course's daily discussion questions to ChatGPT and asking it to draft answers for you *is a violation* of the honor code (plagiarism).
2. Writing your own answer to a discussion question and uploading this to ChatGPT to ask for improvements in grammar or clarity *is **not** a violation* of the honor code as long as the written work remains substantially your own.
3. Using ChatGPT, WolframAlpha, or any other artificially intelligent system to write new code for your final project *is a violation* of the honor code, as it presents another system's work as your own.
4. Using ChatGPT, WolframAlpha, or any other artificially intelligent system to error-check or diagnose problems with code that you have written for your final project *is **not** a violation* of the honor code as long as the work remains substantially your own.
5. Uploading a section of a reading assignment to ChatGPT and asking it to explain the concept to you in different words *is **not** a violation* of the honor code, as long as you do not use its description verbatim in a submission of written work.

Students with Disabilities: If you have a disability and require accommodation in this class, please contact me as soon as possible (within the first two weeks of class) to discuss these accommodations. You will also need to contact the Disability Services Office (telephone extension: 5929) in 118 Reynolda Hall. More information is available at https://lac.wfu.edu/disability-services/.

Syllabus Change Policy: All policies of this syllabus may be changed by Prof. Esarey with advance notice.

COURSE MATERIALS

Required Textbooks:

- Jonathan Schwabish. 2021. *Better Data Visualizations: A Guide for Scholars, Researchers, and Wonks.* New York: Columbia University Press.
- Hadley Wickham. 2021. *Mastering Shiny: Build Interactive Apps, Reports, & Dashboards Powered by R.* Boston: O'Reilly. Free online preprint: https://mastering-shiny.org/.
- Mirzo Kazakoff. 2022. *Persuading with Data.* Cambridge: MIT Press. Related website (not a full pre-print): https://www.persuadingwithdata.com/.
- Robert Kabacoff. 2024. *Modern Data Visualization with R.* CRC Press. Free online preprint: https://rkabacoff.github.io/datavis/.

Required Software:

- Student subscription to the RStudio Server posit.cloud instance; this costs $5 per month.
- Free account on shinyapps.io.

Note: All students must have a valid Wake Forest e-mail address and login (and access to the Canvas website) to participate in this course.

COURSE OUTLINE AND ASSIGNED READINGS

Date	Topic	Readings
1/17	Introduction	N/A
1/22	Visual Processing and Perception	• Schwabish, Ch. 1 (17 pp.) • Kazakoff, Ch. 1 and 2 (38 pp.) • *Optional*: Wickham, Preface (12 pp.) • *Optional*: Kabacoff, Ch. 1 (5 pp.)
1/24	Data Preparation and an Introduction to ggplot2	• Kabacoff, Ch. 2 and 3 (28 pp.)
1/29	Five Guidelines for Better Data Visualizations	• Schwabish, Ch. 2 (24 pp.)
1/31	Form and Function	• Schwabish, Ch. 3 (14 pp.)
2/5	Comparing Categories	• Schwabish, Ch. 4 (64 pp.)
2/7	Univariate Categorical Visualizations	• Kabacoff, Ch. 4, Section 4.1 (17 pp.)
2/12	Distribution	• Schwabish, Ch. 6 (38 pp.)
2/14	Univariate Quantitative Visualizations	• Kabacoff, Ch. 4, Section 4.2 (10 pp.)
2/19	Time	• Schwabish, Ch. 5 (46 pp.)

2/21	Temporal Visualizations	• Kabacoff, Ch. 8 (16 pp.)
2/26	Geospatial	• Schwabish, Ch. 7 (32 pp.)
2/28	Maps	• Kabacoff, Ch. 7 (26 pp.)
3/4	Class Cancelled (illness)	
3/6	Class Cancelled (illness)	
3/11	**Spring Break**	
3/13	**Spring Break**	
3/18	Relationships and Bivariate Visualizations	• Kabacoff, Ch. 5 (45 pp.) • Schwabish, Ch. 8 (22 pp.)
3/20	Statistical Modeling Visualizations	• Kabacoff, Ch. 6 (13 pp.) and Ch. 9 (16 pp.)
3/25	Simplify to Amplify	• Kazakoff, Ch. 4 (22 pp.)
3/27	Build Effective Slides	• Kazakoff, Ch. 5 (25 pp.)
4/1	Structure your Data	• Kazakoff, Ch. 6 (43 pp.)
4/3	Frame the Data to Persuade	• Kazakoff, Ch. 7 (27 pp.)
4/8	Present your Data	• Kazakoff, Ch. 8 (20 pp.) • Optional: Kazakoff, Ch. 9 (26 pp.)
4/10	Your First Shiny App!	• Wickham, Ch. 1 (16 pp.)
4/15	Basic User Interfaces	• Wickham, Ch. 2 (19 pp.)
4/17	Basic Reactivity	• Wickham, Ch. 3 (37 pp.)
4/22	Layout and Themes	• Wickham, Ch. 6 (23 pp.)
4/24	Graphics	• Wickham, Ch. 7 (20 pp.)
4/29	Dynamic UI	• Wickham, Ch. 10 (38 pp.)
5/1	The Reactive Graph and Reactive Building Blocks	• Wickham, Ch. 14 (20 pp.) • Wickham, Ch. 15 (16 pp.)