Data Science Fundamentals in R
Introduction to transparent and reproducible data science

Fall 2025
In Person Delivery
OCN682/MBIO612
Slack Channel OCN682

Lecture: Tuesday 1:00 - 2:50 pm   KEL 103

Flip class: Any time before start of class   At home

Instructor: **Dr. Nyssa Silbiger** e-mail: silbiger@hawaii.edu phone: 808-956-0327 Office Hours: Tuesday 3:00 – 4:00 Office: MSB 612	Teaching Assistant: **Callie Stephenson** e-mail: callies@hawaii.edu Office Hours: Monday 11:00 – 13:00 Office: MSB 305

Free online required readings:

Wickham and Grolemund: R for Data Science: https://r4ds.hadley.nz/
Wilke: Fundamentals of Data Visualization: https://clauswilke.com/dataviz/
Healy: Data Visualization: A practical introduction: https://socviz.co/index.html#preface
Mastering Shiny: https://mastering-shiny.org/
Quarto: https://quarto.org/docs/get-started/hello/rstudio.html
Tidy Modeling: https://www.tmwr.org/base-r

Papers:
Browman and Woo (2018)
Lowndes et al. (2017)
Jennings et al. 2023

Supplemental Texts (optional, but helpful):
Wickham: Advanced R: https://adv-r.hadley.nz/

Course Objectives: This course is intended to make you think like a coder and provide you with a general understanding of how to conduct transparent and reproducible data science. **This course is NOT a statistics or bioinformatics course**. You will learn how to script and use tools to make your data examination more transparent. The specific learning objectives include: 1) Be able to share your code and data on a public version-controlled repository, 2) create a reproducible script, 3) work collaboratively on a project, 4) learn efficient and effective ways to explore your data, 5) create high quality visuals, and 6) learn to love working with data!

Course description: This course will combine a series of lectures with hands-on computer labs and group work. The goal is for you to be an active participant – in lectures and lab – because doing something is the best way to learn it. Further, you will also learn by teaching; therefore, you will have multiple opportunities for peer-learning and teaching in this course. Your grade for the class will be based on coding assignments, presentations, short quizzes, and a final project (see Grading Policy, below). There are no exams in this class; however, learning a coding language, like any language, requires lots of practice and repetition to master it. **Therefore, this class will be a lot of work both in and outside of the classroom.**

In lectures, you will learn fundamental concepts in how to think like a coder and create reproducible data. *You are encouraged and expected to ask questions during the lecture.* Given the short time in class for a 3-unit course, you will also have lectures at home for the first half of the semester. These can be completed at any time but **MUST BE DONE BEFORE THE NEXT CLASS**. At home, you will work on coding homework assignments. All textbooks are free and available online; **you are expected to complete all your required readings before class**.

Grading:

Component	Percent of Grade
Short Quizzes	15%
Tidy Tuesday Plots	15%
Homework Assignments	30%
Class Participation	5%
Final Independent Project	35%
TOTAL	100%

Your grade will be based on the components listed above.

Short quizzes are intended to encourage you to keep up with the readings and gain an understanding of the vocabulary associated with coding. These are maximum 10-minute, multiple choice, open note quizzes, and occur at the beginning of each class. Do not come late. There will be no extra time allowed. You will need to understand concepts associated with coding to be successful on the quizzes. I will drop your lowest grade, so there are no make-up quizzes.

Tidy Tuesdays, based on a weekly international coding group, is intended to advance your tidying and plotting skills with R. You will be required to participate in at least 6 of the 15 weeks this semester. (https://github.com/rfordatascience/tidytuesday). Points will be assigned based on creating an output and submitting your code to GitHub. The assignment details will be introduced AFTER we learn to plot.

Weekly homework assignments will be turned in independently, but you are allowed to have them checked by your classmates first. All assignments must be turned in on GitHub for full credit (this will be explained in class). Assignments will be graded according to the rubrics each week on the class website.

Class Participation will be based on your preparedness (i.e., did you complete the readings and assignments before class), answering and asking good questions, showing up in person, and helping your fellow classmates. This is a collaborative course, and participating is critical to your learning.

Final independent project and presentation, you will use the skills you learned throughout the semester to tell a story with your own data (or publicly available data) and present it to the class according to the rubric on the class website.

Your grade will be based on your percentage of the total possible points. You can use the following cutoffs as a guideline. I reserve the right to lower the grade cutoffs, but do not count on that happening.

Percent	Letter Grade
93-100	A
90-92	A-
88-89	B+
83-87	B
80-82	B-
78-79	C+
73-77	C
70-72	C-
68-69	D+
60-67	D
<59	F

Attendance: This is an intellectually challenging and time-demanding course. Attendance is important to be successful. I understand that we may have field trips or conferences during the semester for our research. Please let me know about dates you will need to miss for your research-related activities.

Communication: Outside of class time, I will communicate with you via your UH email account, *Lamakū*, and our dedicated slack channel. If you do not normally use your UH email account, please configure it to forward your messages to your preferred account. You can expect me to respond to your email or slack messages within 24 hours (except on weekends or if I am in the field). The slack channel will be used for you to easily communicate with your classmates and to ask for advice and share resources. **To sign into our class slack, click on this link and follow the directions**.
    Your best source of course information is the course GitHub site (https://github.com/OCN-682-UH/Fall_2025) and Lamakū. Check the schedule on the

website regularly because occasionally we may have to change the schedule due to unforeseen complications.

Expectations: You can expect me to be punctual, treat you fairly, return your graded assignments in a timely fashion, and most importantly, treat you with respect. In return, I expect you to treat other students, the TA, and me with respect and do everything you can to ensure a comfortable learning environment. For example, jokes or comments made in poor taste that make any member of the class uncomfortable will not be tolerated. Use of cell phones, tablets, or computers during class for any purpose other than those directly related to the class (e.g., note taking and coding) is not allowed.

Diversity and Equity: It is my goal to create a learning environment that supports diversity of thoughts, perspectives, and experiences, and honors your identities. To help create an inclusive environment:
- Please share your pronouns at the beginning of the semester with me.
- If you feel like your performance in the class is being impacted by your experiences outside of class, please do not hesitate to come and talk with me. I want to be a resource for you.
- I am continuing to learn about diverse perspectives and identities. If something was said in class (by anyone, including me) that made you feel uncomfortable, please talk to me about it (Anonymous feedback is always an option).

Policies:
- **Cheating** will result in failure of the course and may result in further University discipline. The UH policy states: *"Cheating includes, but is not limited to, giving unauthorized help during an examination, obtaining unauthorized information about an examination before it is administered, using inappropriate sources of information during an examination, altering the record of any grade, altering an answer after an examination has been submitted, falsifying any official UH Mānoa record, and misrepresenting the facts in order to obtain exemptions from course requirements."*

- **Plagiarism** will result in you failing the assignment. Plagiarism is *"Plagiarism includes, but is not limited to, submitting, to satisfy an academic requirement, any document that has been copied in whole or in part from another individual's work without identifying that individual; neglecting to identify as a quotation a documented idea that has not been assimilated into the student's language and style; paraphrasing a passage so closely that the reader is misled as to the source; submitting the same written or oral material in more than one course without obtaining authorization from the instructors involved; and "dry-labbing," which includes obtaining and using experimental data from other students without the express consent of the instructor, utilizing experimental data and laboratory write-ups from other sections of the course or from previous terms, and fabricating data to fit the expected results."*. Don't do it. If you are uncertain about what constitutes plagiarism talk to me.

- **Late assignments lose 10% per day**, i.e., the most you can receive for an assignment that is one day late is 90% of its point value, 2 days late 80%, etc.

- **Punctuality**: You must be on time for all classes.

- Students with **disabilities** must register with the KOKUA Program, QLCSS 013, phone (808) 956-7511 (Voice/TTY) or (808) 956-7612 (Voice/Text), email kokua@hawaii.edu

- Students and faculty each have responsibility for maintaining a safe and respectful space to express their reasoned opinions. Professional courtesy and consideration for our classroom community are especially important with respect to topics dealing with differences in race, color, gender and gender identity/expression, sexual orientation, national origin, religion, disability, and age.

As your instructor, one of my responsibilities is to help maintain a safe learning environment on our campus. In the event that you choose to write, speak or otherwise disclose about having experienced sexual misconduct/sexual violence, including rape, sexual assault, sexual battery, dating violence, domestic violence, or stalking and specify that this violence occurred while you or the perpetrator were a UH student, federal and state laws require that I, as a "responsible employee," notify our campus Title IX Coordinator. The Title IX Coordinator will contact you to inform you of your rights and options as a survivor and connect you with support resources, including possibilities for holding accountable the person who harmed you. Know that you will not be forced to share information and your level of involvement will be your choice.
UH Title IX Coordinator is:
Jennifer Rose
Hawaii Hall, Room 112
Phone: (808) 956-2299
E-Mail: t9uhm@hawaii.edu, manoa.hawaii.edu/titleix

If you do not want the Title IX Coordinator notified, instead of disclosing the experience to me, you can speak confidentially with our Campus Care Advocate.

- **UH Confidential Advocate:** Leslie Cabingabang, UH Confidential Advocacy, email advocate@hawaii.edu.