Course overview

Time and place

- Time: Mondays and Wednesdays, 10:00 am–12:00 pm
- Exceptions:
  - No meeting on Wednesday, Aug. 31
  - No meeting on Labor Day (Monday, Sept. 5)
  - To make up for missing class on Aug. 31, we will have a supplemental class on Friday, Sept. 9, 10:00 am–12:00 pm. You **will not** lose attendance points if you cannot attend this class, but **will** be responsible for the material covered.
  - No meetings the week of Thanksgiving
- Place: Environmental Health Building, Room 120

Course book

- There is an online book for this course available at: `https://geanders.github.io/RProgrammingForResearch/`
- This book includes course information, course notes, links to download pdfs of lecture slides, in-course exercises, homework assignments, and vocabulary lists for quizzes.
- Because this is my first semester teaching the course with this online book, it will be evolving throughout the semester, as we get to new material.
- The book can be downloaded as a pdf or an eBook.
- Otherwise, we do not have a required textbook for this class. I have, however, listed some books I would recommend if you're looking for additional books to help in learning the material.

Content

We will cover four large themes in this course:

- Entering and cleaning data
- Exploring data
- Reporting data results
- Reproducible research

Content

The first course is preliminaries, and after that there will be three "cycles" of covering these topics:

- **Preliminaries** Week 1
- **Basic** Weeks 2–5
- **Intermediate** Weeks 6–9
- **Advanced** Weeks 10–15
- **Final** Week 16

A detailed course schedule is available in the online course book.

Grading

Your grade will be determined based on the following components:

Assessment component	Percent of grade
Final group project	30
Weekly in-class quizzes, weeks 2-9	25
Homework	25
Attendance and class participation	10
Weekly in-course group exercises	10

Attendance and class participation

Because so much of the learning for this class is through interactive work in class, it is critical that you come to class.

Out of a possible 10 points for class attendance, you will get:

- **10 points** if you attend all classes
- **8 points** if you miss one class
- **6 points** if you miss two classes
- **4 points** if you miss three classes
- **2 points** if you miss four classes
- **0 points** if you miss five or more classes

Weekly in-course group exercises

- Ten points of your final grade will be based on your participation in in-course group exercises.
- As long as you are in class and participate in these exercises, you will get full credit for this component.
- If you miss a class, to get credit towards this component of your grade, you will need to turn in a one-page document describing what you learned from doing the in-course exercise on your own time.
- All in-class exercises are included in the online course book at the end of the chapter on the associated material.

Homework

- There will be six homework assignments, starting a few weeks into the course and then due approximately every two weeks (see detailed schedule in the online course book).
- Homeworks should be done individually.
- Homeworks will be graded for correctness, but some partial credit will be given for questions you try but fail to answer correctly.
- Homework is due by the start of class on the due date. Your grade will be reduced by 10 points for each day it is late, and will receive no credit if it is late by over a week.

Final group project

The final group project will be graded with A through F, with the following point values (out of 25 possible):

- **25 points** for an A
- **20 points** for a B
- **15 points** for a C
- **10 points** for a D
- **5 points** for an F

If you turn nothing in, you will get **0 points**.

Final group project

- You will do the final group project in groups of 2–3.
- The final product will be a statistical blog post-style article of 1,500 words or less and an accompanying Shiny web application. Come up with an interesting question you'd love to get the answer to that you think you can find data to help you answer.
- You will need to use the data you find, and R, to write your article.
- The final product will be a Word document created from an RMarkdown file and an accompanying Shiny web application.

Final group project

- You will have in-class group work time during weeks 10–15 to work on this. This project will also require some work with your group outside of class.
- You will be able to get feedback from me through weekly informal written reports in these weeks. I will also provide feedback and help during the in-class group work time.

Final group project

To get an idea of what your final product should look like, check out these links:

- Does Christmas come earlier each year?
- Hilary: the most poisoned baby name in US history
- Every Guest Jon Stewart Ever Had On "The Daily Show"
- Should Travelers Avoid Flying Airlines That Have Had Crashes in the Past?
- Billion-Dollar Billy Beane

Final group project

- We will discuss expectations and grading for this, create groups, etc. around the middle of the semester.
- The focus for this will be on finding, cleaning, and using good data to answer an interesting question, and on presenting, summarizing, and explaining the data well.

In-class quizzes

- You will have eight total in-class quizzes. You will have one for each of the Week 2–9 class meetings.
- There will be *at least* 10 questions per quiz. You will get 1/3 point for each correct answer.
- If you do the math, you can get full credit for this even if you don't get all of your answers right...
- You can not get more than the maximum of 25 points for this component.

In-class quizzes

- All quizzes will be multiple choice, matching, or some other form of "close-answered" question (i.e., no open-response-style questions).
- You **can not** make up a quiz for a class period you missed. You can still get full credit on your total possible quiz points if you miss a class, but it means you will have to work harder and get more questions right for days you are in class.
- I **will not** ever re-consider the score you got on a previous quiz, give points back for a wrong answer on a poorly-worded question, etc. However, if a lot of people got a particular question wrong, I will be sure to cover it in the next class period. Also, especially if a question was poorly worded and caused confusion, I will work a similar question into a future quiz.

In-class quizzes

- The "Vocabulary" appendix of our online book has he list of material for which you will be responsible for this quiz.
- Most of the functions and concepts will have been covered in class, but some may not.
- You are responsible for going through the list and, if there are things you don't know or remember from class, learning them. To do this, you can use help functions in R, Google, StackOverflow, books on R, ask a friend, and any other resource you can find.
- Using R frequently in your research or other coursework will also help you prepare.

In-class quizzes

An example of the vocabulary list:

- `c()`
- `data.frame()`
- `dim()`
- `head()`, parameter `n =`
- `read.csv`, parameters `head =`, `skip =`, `nrow =`
- `[...]`, `[..., ...]`
- open source software
- Nate Silver

What you have due soon

- Next Monday during class: First in-class quiz. The "Vocabulary" appendix of our online book has he list of material for which you will be responsible for this quiz (Week 1 list).

Helpful books for learning R

There are three publishers that are leaders in good books for learning R:

- O'Reilly
- No Starch Press
- Springer

Helpful books for learning R

Some particular books you might want to check out:

- R for Data Science
- R for Dummies
- R in a Nutshell
- R Cookbook
- R Graphics Cookbook
- A Beginner's Guide to R
- Roger Peng's Leanpub books