**DS 2003: COMMUNICATING WITH DATA**

**Subject Area and Catalog Number:** Data Science, DS 2003, 19026, Section 002

**Year, Term:** 2022, Fall

**Class Title:** Communicating with Data

**Level:** Undergraduate

**Credit Type:** Grade (A-F)

**Meeting Days**: Tu, Thu

**Meeting Time:** 2:00-3:15

**Place:** Clark Hall G004

**Instructors**

Natalie Kupperman, PhD, ATC

* Office: Elson 184A (Old Student Health Center)
* Email: n-kupperman@virginia.edu
* Office Hours: Mondays from 10-11:30a

TA:

* Email:
* Office Hours:

**About the Course**

This course provides practical experiences about how data is commonly used in communication. The general objective is to make you familiar with how to effectively summarize and visualize data in order to share your story. All the examples and analyses will be done mainly in R, with a particular focus on graphical presentations with the R visualization tools like ggplot2, Plotly, and Shiny. Additionally, there will be readings and discussions about how graphs are used in our everyday lives and how, as data scientists, we can effectively, and ethically, display data for stakeholders.

**What You Will Learn Along the Way**

By the end of the course, I hope that you will:

1. Be adept in summarizing and visualizing data using R.
2. Be able to construct meaningful messages from data and effectively deliver them with visualization tools.
3. Have confidence in interacting and collaborating with colleagues.
4. Understand how charts can be used (intentionally or unintentionally) to manipulate results and mislead readers. And how to avoid making these mistakes.

**How You'll Know You Are Learning**

This course will be a combination of lectures and labs. As the course progresses, it will become more lab based. During lab sessions, you should expect to spend your time on your computer working through examples with the class. The best way to become comfortable with the material is to continually practice. The idea by making this lab-based class is that you can practice in an environment where you can ask questions and trouble-shoot with peers. Every class won't go perfectly, but week after week you should be more comfortable with R and the material.

Reflection/s (15%)

Quizzes (20%)

Assignments (20%)

There will be weekly assignments due. These assignments are meant to reiterate the content from the week. Students are asked to work independently on these assignments.

Mid-term Project (20%) - Groups of 3

Final Project (25%) - Groups of 3

**Grading**

Courses carrying a Data Science subject area use the following grading system: A, A-; B+, B, B-; C+, C, C-; D+, D, D-; F. The symbol W is used when a student officially drops a course before its completion or if the student withdraws from an academic program of the University.

Grading Scale:

* 93-100 A
* 90-92 A-
* 87-89 B+
* 83-86 B
* 80-82 B-
* 77-79 C+
* 73-76 C
* 70-72 C-
* <70 F

**University of Virginia Honor System**

All work should be pledged in the spirit of the Honor System at the University of Virginia. The instructor will indicate which assignments and activities are to be done individually and which permit collaboration. The following pledge should be written out at the end of all quizzes, examinations, individual assignments, and papers: “I pledge that I have neither given nor received help on this examination (quiz, assignment, etc.)”. The pledge must be signed by the student. For more information, visit [www.virginia.edu/honor](http://www.virginia.edu/honor).

**Tech Stack**

R/Rstudio – Language and associated IDE in which we will code

Collab – Class materials, submission of assignments, grades, class-wide communications

Github – Repository of class material (not required for class)

**Required Texts**

Cairo, A. How Charts Lie. WW Norton & Company. 2019.

* Available at the bookstore or on Amazon (either edition is fine)
* The Main Library also has a physical copy and audio version.
* The SDS Reserve Library will also have a few copies for students to use while at the School.

**Resources (Web Based)**

[R for Data Science](https://r4ds.had.co.nz)

[R Cookbook]](http://www.cookbook-r.com)

[An Introduction to R](https://cran.r-project.org/doc/manuals/R-intro.pdf)

[ggplot2 book](https://ggplot2-book.org/index.html)

[Plotly](https://plotly.com/r/)

[Shiny](https://shiny.rstudio.com)

**Cheat Sheets**

[Base R](https://iqss.github.io/dss-workshops/R/Rintro/base-r-cheat-sheet.pdf)

[tidyr | dplyr | ggplot | RMarkdown](https://www.rstudio.com/resources/cheatsheets/)

[Plotly](https://images.plot.ly/plotly-documentation/images/r_cheat_sheet.pdf)

[Shiny](https://shiny.rstudio.com/images/shiny-cheatsheet.pdf)

# **SDAC and Other Special Accommodations**

If you have been identified as a Student Disability Access Center (SDAC) student, please let the Center know you are taking this class. If you suspect you should be an SDAC student, please schedule an appointment with them for an evaluation. I happily and discretely provide the recommended accommodations for those students identified by the SDAC. Please contact your instructor one week before an exam so we can make appropriate accommodations. Website: <https://www.studenthealth.virginia.edu/sdac>

If you are affected by a situation that falls within issues addressed by the SDAC and the instructor and staff are not informed about this in advance, this prevents us from helping during the semester, and it is unfair to request special considerations at the end of the term or after work is completed. We request you inform the instructor as early in the term as possible your circumstances. If you have other special circumstances (athletics, other university-related activities, etc.) please contact your instructor and/or TA as soon as you know these may affect you in class.

CAPS

Diversity

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| Semester Week | Class Number | Date | Format | Topic | Notes |
| Week 1 | 1 | 8/23 | Lecture | Intro to Course |  |
| 2 | 8/25 | Interactive Lecture | Intro to R - 1 |  |
| Week 2 | 3 | 8/30 | Interactive Lecture | Descriptive Stats & Intro to R - 2 |  |
| 4 | 9/1 | Interactive Lecture | Intro to R - 3 |  |
| Week 3 | 5 | 9/6 | Lecture | Research Fallacies |  |
| 6 | 9/8 | Interactive Lecture | Descriptive Statistics in R |  |
| Week 4 | 7 | 9/13 | Lecture | Data Visualization & ggplot2 |  |
| 8 | 9/15 | Interactive Lecture | ggplot2 - 1 |  |
| Week 5 | 9 | 9/20 | Lab | ggplot2 - 2 | Midterm Group Assignments |
| 10 | 9/22 | Lab | ggplot2 - 3 |  |
| Week 6 | 11 | 9/27 | Lecture | Linear Regression | Midterm Data Source Selection Due |
| 12 | 9/29 | Lab | Linear Regression |  |