Syllabus, CSCI297b, Scientific Visualization, Winter 2023

Instructor: Dr. Geoffrey Matthews, Parmly 407A, `gmatthews <at> wlu <dot> edu`

Web page: `https://github.com/geofmatthews/csci312`

Office hours: MTWRF 9:30 and by appointment

Lectures: MTWRF 10:30-12:30, Parmly 405

Goals: This course is an introduction to graphing scientific data. We will study the fundamentals of preparing data, graphing it, and presenting these graphcs on the web. We will also study design and human engineering principles to make our graphs more effective. By the end of the course the student should be able to:

- Tidy up datasets from a number of sources so that they are easy to graph in a variety of ways.
- Understand various graph techniques and be able to justify their use in various situations.
- Understand principles of communication that make some graphs good communicators, and other graphs confusing, misleading, or wrong.
- Be able to apply these principles to create new graphs in a wide variety of contexts using R and RStudio.

Texts:

- `https://alexd106.github.io/intro2R/index.html` ..... An Introduction to R
- `https://r4ds.had.co.nz/` ..... R for Data Science
- `https://clauswilke.com/dataviz/` ..... Fundamentals of Data Visualization

Software:

We will primarily be using the RStudio Workbench server, provided by the university at `https://rstudioworkbench.wlu.edu/`.

However, if you want to install R and RStudio on your own computer, they are available here:

- `https://www.r-project.org/` ..... R
- `https://posit.co/download/rstudio-desktop/` ..... RStudio

Grading: Grading will be based on:

Class exercises: Most days class lab exercises will be interspersed with lectures on R and visualizations. If you must miss a day, you are responsible for making up the work on your own time. 20%

Graph of the day: Every day one or two students will present a short (5 minute) report on a particularly good or bad graph found on the internet. We will prepare a schedule of dates for students the first day. Each student should prepare at least one day in advance so that if someone misses their day the next person in line can step up. 20%

Report: A report on a dataset written in Rmarkdown submitted the last day of class. 20%

Oral presentation: A brief (10-15 minute) oral presentation about the dataset analyzed in your written report. 20%

Final exam: The final exam is comprehensive. It will be an online multiple choice exam. It is closed book and closed notes. You may not consult with other people or any other resources during the exam. 20%

Letter grades: A $\geq$ 90% > B $\geq$ 80% > C $\geq$ 70% > D $\geq$ 60% > F

Daily routine:

Time	Activity
10:30	Lecture on R and in-class exercises
11:40	Break
11:50	Graph of the Day
11:55	Lecture & Discussion on Fundamentals
12:30	Class ends

Schedule:

		Lab		Principles
Date	Day	intro2r	RfDS2e	FoDV
2023-04-24	Monday	1		
2023-04-25	Tuesday	2		1,2,3
2023-04-26	Wednesday	2		4,5
2023-04-27	Thursday	3		6,7
2023-04-28	Friday	3		8
2023-05-01	Monday	4		9,10
2023-05-02	Tuesday	4		11,12
2023-05-03	Wednesday	5		13,14
2023-05-04	Thursday	5		15
2023-05-05	Friday	8		16
2023-05-08	Monday	8		17
2023-05-09	Tuesday		10	18,19
2023-05-10	Wednesday		10	20,21
2023-05-11	Thursday		11	22
2023-05-12	Friday		11	23,24,25
2023-05-15	Monday		12	26,27
2023-05-16	Tuesday		12	28,29
2023-05-17	Wednesday	Student presentations		
2023-05-18	Thursday	Student presentations		
2023-05-19	Friday	Student presentations		
Final Exam				