University of Florida
College of Public Health & Health Professions Syllabus

PHC6791: Data Visualization in the Health Sciences (3 credits)

Spring: 2024
Delivery Format: on-campus
Course Website: Canvas

Instructor Name: Steven Foti, PhD
Meeting Times: Mondays 10:40am-11:30am; Wednesdays 9:35am-11:15am
Room Number: HPNP G-112
Phone Number: 352 294 5922
Email Address: fotisj@ufl.edu
Office Hours: Wednesdays 12pm-2pm on Zoom
Preferred Course Communications: email/Canvas inbox

Prerequisites

A course in statistics such as PHC 6052 or equivalent. Some familiarity with R statistical software is recommended but not required.

PURPOSE AND OUTCOME

Course Description

In this course, students will learn the foundations of information visualization and sharpen their skills in communicating using health science data. Throughout the semester, we will primarily use R to explore concepts in graphic design, storytelling, data wrangling and plotting, biostatistics, and artificial intelligence as they apply to data-driven communication.

Course Overview

The world is growing increasingly reliant on collecting and analyzing information to help people make decisions. Because of this, the ability to communicate effectively about data is an important component of future job prospects across nearly all disciplines. Unlike any other courses in biostatistics, students will learn the foundations of information visualization and sharpen their skills in communicating using health science data. Throughout the semester, we will use R and related software to explore concepts in graphic design, storytelling, data wrangling and plotting, biostatistics, and artificial intelligence as they apply to data-driven communication. In addition to techniques covered in other biostatistics courses, we will explore new tools such as the Common Online Data Analysis Platform (CODAP) and R packages tidyverse and plotly. Whether you are an aspiring data scientist or want to learn new ways of presenting health science information, this course will help you build a strong foundation in how to communicate with data.

Course Objectives and/or Goals

Upon completion of the course, students should be able to:

1) Construct sophisticated data displays that express the meaning of public health and health science data.
2) Recommend the best types of data visualizations to use for a given type of data.
3) Generate hypotheses for contexts in biostatistics and artificial intelligence using data visualizations.
4) Critique, evaluate, and assess the appropriateness of a data display.
5) Use visualizations to aid in the presentation of complex scientific concepts to a diverse audience.

Instructional Methods

This course is divided into a series of modules that each contain a list of instructions for completing the module, learning objectives covered in the module, content, and assignments. Foundational learning objectives (FO) typically include skills and definitions specific to a particular module, while mediating objectives (MO) typically require the applications of FOs to more complex problems. These learning objectives culminate to the ultimate objectives (UO), which are listed in the previous section. This course will use lectures, discussions, and activities (individual and group) to build an active learning environment to foster your ability to create data displays that are effective in contributing to your data's story.

DESCRIPTION OF COURSE CONTENT

Course Schedule (subject to change with advanced notice)

Week	Date(s)	Topic(s)	Readings
1	1/8-1/11	Introduction and R Background	Syllabus
2	1/15-1/19	Telling Stories with Data	TED Talk; VT Ch. 1
3	1/22-1/26	Telling Stories with Data	continued
4	1/29-2/2	Theory of Data Graphics	VDQI Ch. 1-5
5	2/5-2/9	Handling Data	VT Ch. 2; R4DS Ch. 5, 12
6	2/12-2/16	Basic Plotting	VT Ch. 5, 6; R4DS Ch. 3
7	2/19-2/23	Basic Plotting	continued
8	2/26-3/1*	Presentations/Enhancing Plots	VDQI Ch. 9; R4DS Ch. 28
9	3/4-3/8	Enhancing Plots for Publication	VT Ch. 4
	3/11-3/15	Spring Break	
10	3/18-3/22	Displaying Data Over Time	continued
11	3/25-3/29	Displaying Spatial Data	VT Ch. 8
12	4/1-4/5	Displaying Spatial Data	continued
13	4/8-4/12	Visuals for Modelling	R4DS Ch. 22-25; VT Ch. 7
14	4/15-4/19	Interactive Displays and Dashboards	https://observablehq.com/@d3/learn-d3
15	4/22-24**	Individual Project Presentations	N/A

*Small Group Project due; **Individual Project due*

Course Materials and Technology
Students will need a laptop that can run R Studio (min. requirements), and an internet connection. Installation of all required tools will be covered in the first week of class. If you have specific questions about these technology requirements, please contact the instructor. Additionally, students will need access to the following textbooks:

1) Required Materials:
    a. Tufte, E. R. (2001). *The visual display of quantitative information* (Vol. 2). Cheshire, CT: Graphics press. ISBN-13: 978-1930824133 **(VDQI)**
2) Reference Materials:
    a. Wickham, H., Grolemund, G. *R for Data Science*. https://r4ds.had.co.nz/ **(R4DS)** – free resource
    b. Yau N. *Visualize This. [Electronic Resource]: The FlowingData Guide to Design, Visualization, and Statistics*. Wiley Pub.; 2011. Available for free through the UF Library. **(VT)**

For technical support for this class, please contact the UF Help Desk at:
- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- https://lss.at.ufl.edu/help.shtml

Additional information about course software/freeware:
- Accessibility Features (R Studio)
- Privacy Policy (R Studio); Privacy Policy (Common Online Data Analysis Platform https://codap.concord.org/)

ACADMIC REQUIREMENTS AND GRADING

Assignments

Engagement Checks (10%) – This course will involve individual/group activities, discussions of course readings, and short readiness quizzes that will aid in learning and ensure all members of the classroom are prepared to be actively engaged in the content. Therefore, completion of these activities is a part of the final grade. These assignments will each be worth 2 points and will receive full credit if all parts of the instructions are completed. Failing to participate in the assignment will result in a 0, and 1 point will be given for partial completion. All these activities will take place inside of the topic modules on the course Canvas page and will be due during the corresponding date ranges for that topic.

Homework (40%) – These assignments will involve exercises in coding/graphing in R, critiquing graphs, and more thorough responses to course readings to evaluate progress toward the course learning objectives. Most of these assignments will be out of 10 points and will be graded for completion and accuracy. Formative feedback will be provided to aid students in achieving the learning objectives. These assignments are similar to standard homework and will be worked on throughout a topic module. These assignments will be announced at the beginning of each topic module along with their due dates. There will be roughly one assignment for each week, but in some cases there will only be one per topic module.

Small Group Project (20%) – In small groups, students will use data visualizations to understand a problem associated with a provided data set. Groups will work to develop a data-driven proposal for a solution to the provided problem that will be summarized and presented to the class. The presentation should include a minimum of 2-3 data visualizations that help describe the data and/or help describe the group's proposed solution. These projects should be no more than about 10 slides and will be graded on the appropriateness of the proposal and the quality of the data graphics used, according to concepts learned in the course. The presentation and code used to generate visualizations will be submitted via the course Canvas page and processed by TurnItIn. A detailed breakdown of the weekly progress checkpoints for this project will be provided on the course page.

Individual Project (30%) – Each student will use a set of data that they are currently involved with or a set of data that they are interested in analyzing in some form to create a series of visualizations that reveal insights into their data. Students will then prepare an 8-12 minute presentation to provide the context of their data set, questions posed, and visualizations that communicate answers to those questions. The presentation should include a minimum of 3-5 data visualizations that aid in presentation. These projects will be graded on clarity, appropriateness, and quality of the data graphics used, according to concepts learned in the course. The presentation and code used to generate visualizations will be submitted via the course Canvas page and processed by TurnItIn. A detailed breakdown of the weekly progress checkpoints for this project will be provided on the course page.

Grades and feedback for all assignments will typically be provided within 1 week of the due date.

Grading

Percentage Earned	Letter Grade
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
Below 60	E

Please be aware that a C- is not an acceptable grade for graduate students. The GPA for graduate students must be 3.0 based on 5000 level courses and above to graduate. A grade of C counts toward a graduate degree only if based on credits in courses numbered 5000 or higher that have been earned with a B+ or higher.

Letter Grade	Grade Points
A	4.0
A-	3.67
B+	3.33
B	3.0
B-	2.67
C+	2.33
C	2.0
C-	1.67
D+	1.33
D	1.0
D-	0.67
E	0.0
WF	0.0
I	0.0
NG	0.0
S-U	0.0

More information on UF grading policy may be found at:
http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades

Policy Related to Make Up Work

If you anticipate not being able to work through the course for an extended period of time (e.g., a significant portion of a particular week), please let me know as soon as possible so that we can discuss a schedule for making up missed work. In general, if you know ahead of time that you will be unavailable for an acceptable reason, it is preferred that

you turn in the missed work ahead of time. There will be no penalty for late work if you contact me ahead of the due date with an acceptable reason. Late work will receive a 0 if the due date arrives and you have not contacted me about requesting an extension.

Policy Related to Required Class Attendance

Attendance is expected, but not required for a grade. However, you will be expected to pace yourself in alignment with the posted announcements and course schedule. If you have extenuating circumstances in line with excused absences from the UF Graduate Catalog, please let me know as soon as possible and we can work together to avoid falling behind.

Excused absences must be consistent with university policies in the Graduate Catalog (http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance).

STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT

Expectations Regarding Course Behavior

Students are expected to participate and engage in discussions in a professional manner. The nature of these discussions will often have elements that depend on personal preference and further, due to the nature of statistics, may have more than one acceptable answer/solution. Therefore, students are expected to be considerate of others' responses that may not align with their own.

Communications Guidelines

Please follow general netiquette guidelines in all course communications with the instructor and fellow students. I will do my best to answer all student emails in a timely manner. During the week, this usually means within a couple of hours, but definitely within 24 hours. On the weekend, I will do my best to respond within 24-48 hours.

Academic Integrity

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

"On my honor, I have neither given nor received unauthorized aid in doing this assignment."

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student

Website for additional details:
https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/
http://gradschool.ufl.edu/students/introduction.html

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

Online Faculty Course Evaluation Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/ . Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

SUPPORT SERVICES

Accommodations for Students with Disabilities
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. Click here to get started with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Counseling and Student Health
Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: http://www.counseling.ufl.edu. On line and in person assistance is available.
- You Matter We Care website: http://www.umatter.ufl.edu/. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: https://shcc.ufl.edu/
- Crisis intervention is always available 24/7 from:
    - Alachua County Crisis Center: (352) 264-6789
    - http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

Inclusive Learning Environment
Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious and political values. We further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act." If you have questions or concerns about your rights

and responsibilities for inclusive learning environment, please see your instructor or refer to the Office of Multicultural & Diversity Affairs website: www.multicultural.ufl.edu