PSY 4724 - 001
Programming with Data
14636, Section 001, 3 credit hours
University of South Florida, Psychology

Course Syllabus

Semester: Spring 2024
Class Meeting Days: Tuesdays and Thursdays
Class Meeting Time: 9:30 AM – 10:45 AM
Class Meeting Location: PCD 2122

Instructor: Jacob Zepp, M.A.
Office Location: PCD 3104
Help Hours: Tuesdays and Thursdays, 11:00 AM – 12:30 PM or by appointment
Email: jacobzepp@usf.edu

Teaching Assistant: Rachel Gaynor
Office Location: PCD 2123, or via Teams
Help Hours: Wednesday and Thursday, 12:00-1:00 PM
Email: gaynorr@usf.edu

Welcome!
This course is an introduction to data science and programming using the R programming language. We will cover topics ranging from data importing and wrangling, to data exploration and functional programming, to data visualization. We will also address best practices in data management and developing reproducible workflows.

University Course Description
This course empowers students to use the R programming language to answer modern data science and applied psychology problems. It covers data wrangling, exploration, visualization, communication, functional programming, text mining, and web scraping principles to address human behavioral research questions. It addresses best practices in data management and reproducible workflows.

Course Prerequisites
Not applicable

Course Objectives
The application of R as a data science tool will be explored. The course consists of integrated components of lectures, readings, presentations, discussions, and independent study.

Student Learning Outcomes

At course completion, students should attain:

- Knowledge of how to use R to wrangle data, clean data, run basic statistical analyses (e.g., regression), and create data visualizations
- The ability to use the scientific method to determine ways in which data can be leveraged to provide insights that can be used to solve problems
- An expanded appreciation of how research is conducted and disseminated, particularly within an industry context
- Enhanced critical thinking skills, especially as a consumer of research in applied psychology

Temporary Remote Instruction

During any semester, there is a possibility the course may be disrupted, whether due to continued pandemic, hurricane season, or any other disruptive event. In the event of a need for remote learning, synchronous sessions using Microsoft Teams will be used.

Required Textbook

Wickham, H., & Grolemund, G. (2016). *R for data science: import, tidy, transform, visualize, and model data*. " O'Reilly Media, Inc.".

- **NOTE:** Textbook is available for free online at: https://r4ds.had.co.nz/index.html

Required Software

- R: (https://cran.r-project.org/)
- R Studio: (https://rstudio.com/)

Attendance Policy

Class attendance is required. Students are responsible for all material covered in class and in assigned readings (due to time restrictions, lectures are in a condensed format and are by no means exhaustive). It is important that you read the material and prepare questions BEFORE coming to class (e.g. read chapter X before the lecture that will cover chapter X). Attendance will be taken in the form of participation in an in-class assignment which will be used to determine your participation grade and does account for a percentage of your grade.

Class Communication

Main communication will be on Canvas. It is the student's responsibility to check announcements on Canvas. Course lecture slides will eventually be posted to Canvas; however, they may not cover all material discussed in class.

An instructional guide for Canvas may be found at: http://guides.instructure.com/m/8470.

Grade Categories and Weights

Your grade will be based on several components which are outlined below. You will also have the opportunity to earn up to forty points of extra credit (4% of total grade) through extra credit assignments.

To calculate your final grade, divide the number of points you have earned by 1000.

Assignment	Points	% of Grade
In-class Participation	**100 points**	**10.0%**
Weekly Assignments	**300 points**	**30.0%**
Weekly Code Review	**100 points**	**10.0%**
Group Presentation	**100 points**	**10.0%**
Group Peer Evaluation	**50 points**	**5.0%**
Individual Project Presentation	**125 points**	**12.5%**
Individual Project Paper	**225 points**	**22.5%**
Total	**1000 points**	**100.0%**
Extra Credit	***50 points***	***5.0%***

Grading Scale

Extra points earned through extra credit assignments will be added to your total, and the result will be divided by 1000 to obtain your course average. Based on your average, letter grades will be assigned as follows:

90.0+	(A)
80.0 - 89.9	(B)
70.0 - 79.9	(C)
60.0 - 69.9	(D)
0.0 - 59.9	(F)

Participation (100 points)

Designated class sessions will include an in-class assignment. Participation in the in-class assignment will earn a full participation grade for that day. There are 25 scheduled class assignment days (identified on course calendar) that will be used to calculate your overall participation grade with each worth 4 points. **In the event of an *excused* absence,** a student can provide a response paper to that week's assigned reading to receive full participation points for that day. The response paper must be 2-3 pages (double spaced, 1" margins, Times New Roman) and is due within 72 hours of the missed class. *If two classes are missed in a week, then the student must complete (1) the aforementioned response paper for missing the first day, and (2) a second response paper that provides an alternative way to address the question posed in the lab assignment.* Each paper will be due within 72 hours of each missed class.

Weekly Assignment (300 points)

For 10 weeks of the course, you must complete a programming assignment; each assignment will be worth a maximum of 30 points. You must submit this assignment following the reproducible research procedures demonstrated in the second week of the course. For each assignment, you are expected to (1) write code to solve the assigned problems, (2) document your code and its logic, and (3) write narrative text to accompany your code as part of a larger report. *You will be evaluated not only on the outcome of your code (does it produce the correct results), but also on the clarity of your documentation and narrative report and your adherence to good programming style guidelines.* After receiving peer code review (see below), you may revise your assignments. The following timeline will be used for each weekly assignment:

- Thursday – Assignment provided (and often partially done) in class
- Sunday by 11:59PM - Submit 'first draft' (not graded version) of code via Canvas using reproducible research procedures covered in second week of class. Documents must be submitted within your discussion board for that week as well as in the relevant assignment within the assignments section.
- Monday by 11:59PM – Provide feedback to your partner using the provided rubric and send feedback to your partner. Documents must be submitted within your discussion board for that week as well as in the relevant assignment within the assignments section.
- Wednesday by 11:59PM – Submit 'final' assignment on Canvas using reproducible research procedures covered in second week of class. This file will be used to assign your Weekly Assignment grade.

Weekly Code Review (100 points)

For each weekly assignment, you will also be required to review your classmates' code and provide constructive feedback; each weekly code review will be worth a maximum of 10 points. You should both (1) test the code to ensure that it produces correct output and (2) provide feedback on program design, coding style, and documentation using a rubric. Code reviewers must be submitted within your discussion board for that week as well as in the relevant assignment within the assignments section by 11:59PM on Monday each week.

Group Presentations (100 points)

In lieu of a midterm exam, students will give one 5-minute presentation in groups of two on an assigned 'Tidy Tuesday' prompt. Specifically, students will be expected to use the lessons taught in the first half of the semester to provide a brief overview of how they may opt to go about answering the question within the given prompt. The prompt for each student will be determined after the second week of class. Specifically, two-to-three topics will be chosen based on student interest with 3+ groups of two students assigned to each of the selected prompts. The topic options will be provided in class.

Group Peer Evaluation (50 points)

To help ensure equal participation, each group member will provide a brief peer evaluation for each member of their team following the group's final presentation. 50 points will be received for submitting your group peer evaluation.

Final Project (350 points *total*)

At the end of the course, you will be required to submit a report wherein you choose a dataset, import it, wrangle it, and produce analytic results and visualizations to address a research question of interest to you. Several datasets will be provided in class, or you may select and procure your own. This project will have two components:

Part 1: Individual Project Presentation (125 points)

You will be asked to present your research project plan three weeks prior to finals. The style of this presentation will cover information about the dataset and the variables within it, the intended research question, rationale for why the research question is worth investigating, and the planned analyses. During this project, the instructor, teaching assistant, and other students within the class will provide suggestions related to additional analyses or alternatives ways to use the data to investigate the problem which may be implemented prior to the final report.

Part 2: Individual Project Paper (225 points)

In lieu of a final exam in this class, you will be asked to write a report (including code). Reports will include what your research question is, rationale for why the research question is worth investigating, detail on how it was analyzed (including dataset information as well as wrangling and analysis descriptions), relevant results and visualizations, and takeaways based on the results. Reports will have no minimum page length.

Extra Credit (50 points)

Extra Credit: Sona Study Participation (5 points per Sona credit, up to 50 points)

- You have the opportunity to earn up to 50 points of course credit (a 5% increase in your final grade) through participating in Sona studies.
- Each Sona credit translates into 5 course points, up to 50 points (or 10 Sona credits) - You can sign up for studies via SONA here: https://usf.sona-systems.com/.
- You must assign your points to this course/instructor to receive credit.
- SONA closes on April 19th
- Note that SONA closes before the semester ends!

Alternative Extra Credit (10 points each, up to 50 points): Tidy Tuesday Analysis

- Each week the Tidy Tuesday project provides a dataset along with publicly shared code in order to provide opportunities for individuals to practice data science. For this assignment, any Tidy Tuesday dataset can be used with the exception of any datasets presented within the Group Presentation assignment.
- For extra credit, students can submit a report that outlines the research question they sought to investigate, what they did to provide information about the question, a table or visualization that outlines their result, and their takeaways based on their results. Reports will have no minimum page length.
- *Each report will be worth 10 extra credit points. You may complete up to five article response papers in order to earn a maximum of 50 extra credit points. Should you choose this extra credit option, the response papers are due by* **Friday, April 19th by 5:00 PM.**

Note that you may only obtain a maximum of 50 points towards extra credit. You may mix and match either option (i.e. do some Sona and some Tidy Tuesday) but you can only apply a maximum of 50 points to the course in extra credit.

COURSE POLICIES

Email Etiquette: Email is formal correspondence. Please treat it accordingly. All email should have a relevant subject line and the course number (PSY4724). Please use your USF email address. Try to use proper grammar, complete sentences, correct spelling, and an appropriate tone. Be sure to be clear in your message, concisely summarizing your questions. Please inform me of where you tried to look up the information in your e-mail. Also, please check the course syllabus before emailing me with a question. I reserve the right not to respond to your email if you ask a question that is answered in the syllabus.

Classroom Behavior: Students who have questions or comments during class are expected to raise their hands and address the instructor with courtesy and respect when called on. Disruptive behaviors, including excessive talking, sleeping, reading, texting, surfing the internet, or other activities that disturb other students or the instructor will not be tolerated during class. Students engaging in such behaviors will be reprimanded, and if necessary, asked to leave (Campus police are available to enforce this policy.). A reprimand will result in the forfeiture of extra credit points earned to date, and any subsequent class disruptions will result in referral to university authorities for dismissal from this course with a grade of F and other penalties through the University System.

Incompletes: Incompletes will only be granted in the case of medical or personal emergencies. Incompletes can only be given if you are receiving a grade of "C- " or higher on work already completed. Contact the instructor as soon as you suspect you might need to take an incomplete in the course. However, failure to complete the required work by the end of the next regular semester will result in a grade of F.

Course Notes and Recording Policy:
Please refer to the Course Notes and Recordings Policy provided by USF. This can be accessed using the following link: https://catalog.usf.edu/content.php?catoid=13&navoid=1578#course-notes-andrecording

EXCUSED ABSENCES
Students who anticipate the necessity of being absent from class due to the observation of a major religious observance or an official school-related event must provide notice of the date(s) to the instructor, in writing, at the beginning of the semester. This is an institutional policy.

Standard University Policies
USF has a set of central policies related to student recording class sessions, academic integrity and grievances, student accessibility services, academic disruption, religious observances, academic continuity, food insecurity, and sexual harassment that **apply to all courses at USF**. Be sure to review

these online at: https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx. Additionally, for your convenience, I have copied and pasted these policies below:

I reserve the right to modify this syllabus when deemed necessary and appropriate to accomplish the goals of the course. Any changes/modifications will be announced in class or via email.

Course Schedule*

Week	Date (T/R)	Topic	*Recommended* Reading Assignment***	Other notes
1	Jan 9 Jan 11**	Welcome to data science Methods refresher	Syllabus, Chap 1	No new weekly assignment will be assigned on January 11
		NOTE: ADD DROP ENDS JANUARY 12th		
2^	Jan 16** Jan 18**	Introduction to R, R Studio, & R Markdown Version control, and project management	Chap 2-4	
3^	Jan 23** Jan 25**	Exploring data: ggplot & dplyr Exploring data: ggplot & dplyr	Chap 5	
4^	Jan 30** Feb 1**	Exploring data: ggplot & dplyr Exploring data: ggplot & dplyr	Chap 6-8	
5^	Feb 6** Feb 8**	Tidy data, tidyr, pivoting, if-else Merging data	Chap 10-13	
6^	Feb 13** Feb 15**	Making tables: tibble, broom, & flextable Making tables: tibble, broom, & flextable	Chap 9, 14-16	
7^	Feb 20** Feb 22**	Writing functions Writing functions	Chap 17-19	
8^	Feb 27** Feb 29**	Group presentations Advanced plot creation: plotly & ggpubr		
9^	Mar 5** Mar 7**	Text analysis Text analysis	Chap 20-21	'Rough draft' for weekly assignment assigned on March 7 due on Sunday, March 17 at 11:59PM
NA	*Mar 12* *Mar 14*	*No class. Spring break. Have fun!*		
10^	Mar 19** Mar 21**	Advanced tidyverse Advanced tidyverse		
		NOTE: LAST DAY TO WITHDRAW (NO REFUND & ACADEMIC PENALTY) IS MARCH 23rd		
11^	Mar 26** Mar 28**	Writing papers within R: papaja & rticles Writing papers within R: papaja & rticles		Ideas for individual presentation due on March 28

12^	Apr 2** Apr 4**	Advanced topics Advanced topics	No new weekly assignment will be assigned on April 4
13	Apr 9** Apr 11**	Individual project presentations Individual project presentations	
14	Apr 16 *Apr 18*	Individual project presentations overflow and in-class coding for individual paper In-class coding for individual paper	All Extra Credit Due April 19
15	Apr 23 Apr 25	In-class coding for individual paper In-class coding for individual paper	
Final Paper Due Thursday, May 2nd by 9:30AM			

*The course schedule is subject to change

**These days will be used to calculate your participation grade

***Chap refers to the chapter of the assigned R for Data Science Textbook

^ Weekly Assignments are due for these weeks.