

# PSY-703: Data Science for Psychologists

S. Mason Garrison

November 17, 2020

---

Section: Monday

Medium: Blended

Class Room: GREENE

Class Hours: M @ 9:30a-10:XXa

Section: Friday

Medium: Blended

Class Room: GREENE

Class Hours: F @ 9:30a-10:XXa

---

Canvas: [wakeforest.instructure.com/courses/XXX](https://wakeforest.instructure.com/courses/XXX)

Github: <https://github.com/R-Computing-Lab/DataScience4Psych>

Professor: S. Mason Garrison

E-mail: [GarrisSM@wfu.edu](mailto:GarrisSM@wfu.edu)

WFU Office: GREENE 438

Virtual Office: Zoom [wakeforest-university.zoom.us/j/84567890123](https://wakeforest-university.zoom.us/j/84567890123)

Hours: By Appointment [calendly.com/smasongarrison](https://calendly.com/smasongarrison)

---

## Course Description

Data Science for Psychologists (DSP) introduces on the principles of data science, including data wrangling, modeling, visualization, and communication. In this class, we link those principles to psychological methods and open science practices by emphasizing exploratory analyses and description, rather than confirmatory analyses and prediction. We'll work our way thru Wickham and Golemund's R for Data Science text (<http://r4ds.had.co.nz/>) and develop expertise in tidyverse (<https://www.tidyverse.org/>). This class emphasizes replication and reproducibility. DSP is a practical skilled-based class and should be useful to students aiming for academia as well as those interested in industry. Applications of these methods can be applied to a full range of psychological areas, including perception (e.g., eye-tracking data), neuroscience (e.g., visualizing neural networks), and individual differences (e.g., valence analysis).

To do well in the course, you should read the assigned material before class and re-read previously assigned material as the course progresses. By reading the text before class you will be better prepared to ask questions and integrate the content of lectures with what was presented in the text. Also be sure to attend all lectures and arrive on time. Each topic builds directly on the previous one. Thus, if you miss one lecture, you run the risk of being completely lost in the next lecture.

## **Broad goals for the course:**

- 1. Reproducibility;
- 2. Replication;
- 3. Robust Methods;
- 4. Really Nice Visualization; and
- 5. R.

## **Required Materials**

Wickham and Grolemund's R for Data Science text (<http://r4ds.had.co.nz/>)

*How to use the required text:*

The text is intended to supplement the lectures. The lectures don't follow the order of chapters in the text and the text covers some material that won't be covered in the lectures, i.e., not all the information in each chapter is perfectly pertinent to the course requirements.

## **Course Assignments**

You will be formally evaluated in five different ways.

### **Individual data Project**

You will turn in your individual data collection/data analysis projects on Wednesday, September 18. These projects are described in a separate handout. This project will be worth 10% of your grade.

### **Quiz**

There will be two 30-minute quizzes over lecture material and readings (on September 25 and October 30). These will be objective style quizzes. Make-ups will only be given under extraordinary circumstances and by prior arrangement. Each quiz = 10% of your grade.

### **Presentations**

You will give two presentations. Your group will give a 15-20 minute presentation of its data analysis problem on November 11 or 13. In addition, you will give a 15- minute individual presentation on November 13-20. These presentations together count for 10% of your grade (5% each). Each student will get an automatic 92 (i.e., a neutral A) if you give your presentations in a timely and well-prepared Fashion (i.e., no counting off for nervousness, for presentation quality, etc. – this is a chance to practice a formal presentation in a relatively pressure-free setting).

## Book Review

Graduate students will read two of the following, undergraduate students one of the following, and will write a one-page book review on each book read. The first (grad student) book report is due Monday, October 7. The second (both grad and UG is due December 2. The books to choose from are:

- Lee Wilkinson, The Grammar of Graphics
- Edward Tufte, The Visual Display of Quantitative Information
- Howard Wainer, Visual Revelations

Book reports count for a total of 10% of your grade (5% each for grads, 10% for the one UG report).

## Portfolio

The major semester projects (described on the separate hand-out) is a set of EDA Projects, which you will summarize in an EDA Portfolio to be handed in on Wednesday, December 4, the last day of class. Project = 50% of your grade.

### *Quiz Dates*

- Quiz 1: Friday, 09/25
- Quiz 2: Friday, 10/30

## Engagement Activities

There will be multiple engagement activities in this course. These activities will allow you engage with the material for each module. Details about the specific activities will be provided on canvas. Students must complete one activity per module.

## Grading Policy

Typically an A- is defined as 90% of the highest point total in the class, B- as 80% of that total, C- as 70 and D- as 60%. I may shift these values down to provide a better fit to the actual point distribution. By scaling to a % of the highest point total in the class, each student has a much better chance of receiving higher grades than if no re-scaling were done.

## Course Policies

### **Class Presence and Participation.**

In previous semesters, I have had a deliberately hardline attendance policy. In the light of the public health crisis, I have done away with the this policy as it doesn't align with my general philosophy of treating students as junior colleagues.

Class presence and participation points are given to encourage your active engagement with the material. You will be rewarded with a perfect score as long as you engage meaningfully with the material and your peers.

### *Excused absences*

As a reasonable and empathetic human, I recognize that life happens. There will be times when your outside life conflicts with scheduled class events. These life events can be any of the obvious things (sports, religious holidays, illness, interviews, etc), but they can also be the less obvious, like spending the entire night looking for your lost pet. My general approach is to work with you. You just need to let me know – ideally ahead of time.

Except in the case of true emergencies, a possible excused absence should be discussed with me as far in advance as possible and must occur beforehand. You should not assume that an excused absence will automatically be granted – but you may assume that I am a reasonable, empathetic person. This discussion should occur via email. If you also discuss your situation verbally, please send a summary of the discussion via email to me. An unexcused absence will result in a zero for any graded work that should have been performed for or during the missed class.

## **Academic Dishonesty Policy**

All work submitted for credit must be the student's own and is subject to the provisions of the Wake Forest Honor Code. Details can be found at the Student Conduct web site: [studentconduct.wfu.edu/honor-system-wfu](https://studentconduct.wfu.edu/honor-system-wfu).

## **Accommodations Policy**

If you are (or become) disabled (in any capacity, permanently, or temporarily), and need accommodations in class, reading, or any other work in this course, please contact me to discuss your specific needs as soon as possible. Students who need reasonable accommodations for disabilities also should contact the Learning Assistance Center & Disability Services [lac.wfu.edu](https://lac.wfu.edu).

## **Public Health in the age of COVID-19**

Each of us shares responsibility for the health and safety of all in a learning space. Maintaining a consistent six feet of distance; wearing a face covering; limiting our gathering sizes; and isolating or quarantining when ill or exposed to someone with the virus are Wake Forest University directives and policies we all must follow. Students are encouraged to visit the Our Way Forward website ([ourwayforward.wfu.edu](https://ourwayforward.wfu.edu)) to stay informed about the latest guidance and review the [Public Health Emergency Addendum to the Student Code of Conduct](#).

Specifically, in this room, we will mitigate the risks of virus transfer and take care of our community by abiding by the following safety directives:

- maintain six feet of distance at all times when feasible.
- wear a face covering for the entirety of class. This face covering should cover your mouth and your nose, and adhere to [our University face covering policy](#) (no face shields without masks; no neck gaiters; no bandanas; and no masks, including N95, with a one-way valve).

- stay out of class when sick or after being exposed to someone who is sick.

In this class, any student who does not follow these requirements will be asked once to follow the safety directives. I will offer you a mask or ask you to find one. If you do not comply, I will ask you to leave the class for that day. [I will also refer the matter to the COVID-19 compliance reporting system.](#) Possible disciplinary actions may follow as described in the Wake Forest University Undergraduate Student Conduct Code Public Health Emergency Addendum.

## Classroom Climate

I aim to create a learning environment for my students that supports a diversity of thoughts, perspectives, and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, political affiliation, etc.) To help accomplish this:

- If you have a name and/or set of pronouns that differ from those that appear in your official records, please let me know!
- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you. Remember that you can also submit anonymous feedback (which will lead to me making a general announcement to the class, if necessary to address your concerns).
- I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it. (Again, anonymous feedback is always an option).

## Department Statement

The Psychology Department values, respects, and celebrates the experiences, beliefs, and practices stemming from varied cultures and circumstances (emphasizing, but not limited to, those from historically underrepresented groups), and our deep commitment to diversity, equity, and inclusion plays out through coursework, programming by majors, and research.

## Tentative Class Schedule

This syllabus is intended to give the student guidance in what may be covered during the semester and will be followed as closely as possible. Dates for tests and assignments won't change, barring extraordinary events. However, I reserve the right to modify, supplement and make changes as the course needs arise. I try to avoid changes to the syllabus. Nevertheless, if changes occur, they will always be advantageous to the students.

**Week 01, 08/24 - 08/28 : Introduction and What is Data Science**

**Week 02, 08/31 - 09/04 : Graphical Data Analysis**

**Week 03, 09/07 - 09/11 : Graphical Masterpieces**

**Week 04, 09/14 - 09/18 : Scatterplots and Correlations**

**Week 05, 09/21 - 09/25 : Quiz 1**

**Week 06, 09/28 - 10/02 : Exploratory Data Analysis**

**Week 07, 10/05 - 10/09 : Data Transformations**

**Week 08, 10/12 - 10/16 : Robustness and Resistance**

**Week 09, 10/19 - 10/23 : Replication**

**Week 10, 10/26 - 10/30 : Quiz 2**

**Week 11, 11/02 - 11/06 : Modern Data Science**

**Week 12, 11/09 - 11/13 : Archival Data**

**Week 13, 11/16 - 11/20 : Data mining and CART**

**Week 14, 11/23 - 11/27 : Special Topics**

**Week 15, 11/30 - 12/04 : Special Topics**

**References**