Course Syllabus:
PSY450/650–Data Science in Psychology & Neuroscience

Credits: 3
Academic Department (or campus): Psychology
Campus: Main Campus
Semester Offering: Fall, 2022
Class location and time: Logan Hall 125, TR 11:00 AM — 12:15 PM
Attendance: Mandatory

Instructor Information
Instructor Name: Dr. Jeremy Hogeveen
Instructor Email: jhogeveen@unm.edu
Office Hours: By appointment.

Course Materials & Content
Laptops:

- The best learning experience in this course results from students following along with data science exercises in real-time. If you want to get the most out of this course, please bring a laptop computer you are comfortable using. If you do not have access to a laptop, please email me and we will see what we can do.

All course materials will be uploaded to this GIT repository:

- *DSPN Fall 2022 Github*

There is no official textbook. But, here is a list of things I used for inspiration in organizing the course:

- *Computational neuroscience and cognitive modeling*
- *UCSD COG Intro to Python*
- *Data Science in Practice*
- *Data Science in R*
- *Data Science from Scratch*
- *Git-It Github Training*
- *The Art of Readable Code*

Lecture Attendance: This is a lecture-focused course. All key information will be covered in detail in class. Attendance is mandatory.

Why we are here?

1. To provide some of the scaffolding needed to become excellent and efficient data scientists, including computer programming, data wrangling, and data exploration & analysis.
2. To provide BOTH i) a soft landing for psychology and neuroscience trainees who are very new to programming, AND ii) an opportunity for more advanced coders to further hone / develop their skills.

Specific learning objectives:

1. Proficiency in Python and R programming languages.
2. Efficient and effective data wrangling skills.
3. Advanced data visualization capabilities.
4. Introduction to advanced data modeling and prediction.

Tentative Lecture Schedule

Wk	Day	Class Topic	Assignments
1	T, 8/23	DSPN Introduction Part 1	
	R, 8/25	DSPN Introduction Part 2	
2	T, 8/30	Iteration Part 1	
	R, 9/1	Iteration Part 2	
3	T, 9/6	Conditionals Part 1	
	R, 9/8	Conditionals Part 2	Iteration Assignment Due
4	T, 9/13	Harmonic Oscillator Debrief	
	R, 9/15	Functions	
5	T, 9/20	Integrate-and-Fire Debrief	Conditionals Assignment Due
	R, 9/22	Data Wrangling Part 1	
6	T, 9/27	Data Wrangling Part 2	
	R, 9/29	Data Wrangling Part 3	
7	T, 10/4	Visualization Part 1	
	R, 10/6	Visualization Part 2	Wrangling Assignment Due
8	T, 10/11	Visualization Part 3	
	NO CLASS		
9	T, 10/18	Wrangling Assignment Debrief	
	R, 10/20	Inferential Modeling Part 1	Visualization Assignment Due
10	T, 10/25	Inferential Modeling Part 2	
	R, 10/27	Inferential Modeling Part 3	
11	T, 11/1	Visualization Assignment Debrief	
	R, 11/3	Predictive Modeling Part 1	Inferential Modeling Assignment Due
12	T, 11/8	Predictive Modeling Part 2	
	R, 11/10	Predictive Modeling Part 3	
13	T, 11/15	Inferential Modeling Assignment Debrief	
	R, 11/17	Final Assignment Discussion 1	Predictive Modeling Assignment Due
14	T, 11/29	Final Assignment Discussion 2	
	R, 12/1	Predictive Modeling Assignment Debrief	
15-16	T, 12/6; R, 12/8	Independent work on final assignment.	Final Assignment Due December 17th
	T, 12/13; R, 12/15		

Course Assignments:

Note: Upload to Dropbox folder linked to each assignment due date below!

- Assignment #1: *Due September 8th at 11 PM*.
- Assignment #2: *Due September 20th at 11 PM*.
- Assignment #3: *Due October 6th at 11 PM*.
- Assignment #4: *Due October 20th at 11 PM*.
- Assignment #5: *Due November 3rd at 11 PM*.
- Assignment #6: *Due November 17th at 11 PM*.
- Final Assignment: *Due December 17th at 11 PM*.

Grade Composition:

- Assignments 1-6: 10% each (60% of final grade)
- Final Assignment: 20%
- Participation: 20%

A Note on Individualized Grading

Assignments:

You will be given a "starter file" for each of the assignments. What you end up submitting could range from 1) simply finishing what I've set up in the starter, to 2) coding your own stuff from scratch and generating something that goes above and beyond what I asked for. Either end of this range may be appropriate—it completely depends on your prior coding experience. If you fully apply yourself and clearly put in the effort to advance your skills each week, you will do great on the assignments, whether you're a total rookie or a veteran coder.

Final Assignment:

In data science training, you often have to learn new skills on top of managing existing projects. Often, it's totally unclear whether those skills are *definitely* going to pay off. In the final assignment, I will work with each of you to come up with a data science project that is directly relevant to your future research or industrial career interests. The goal here is to give you a chance to receive course credit for developing your data science skills on an independent project. As with the other assignments, the breadth and quality of the final submission will be evaluated according to each individuals' preexisting quantitative skills.

Participation:

Attending and following along with coding lectures will determine your ability to do well in this course. Simply coming to class will earn you about 80% of the participation grades in the course, and the remining 20% can be earned by asking and answering questions regularly.

COVID-19 Health and Awareness.

UNM is a mask friendly, but not a mask required, community. To be registered or employed at UNM, Students, faculty, and staff must all meet UNM's *Administrative Mandate on Required COVID-19 vaccination*. If you are experiencing COVID-19 symptoms, please do not come to class. If you have a positive COVID-19 test, please stay home for five days and isolate yourself from others, per the *Centers for Disease Control (CDC) guidelines*. If you do need to stay home, please communicate with me at *jhogeveen@unm.edu*; I can work with you to provide alternatives for course participation and completion. UNM faculty and staff know that these are challenging times. Please let us know that you need support so that we can connect you to the right resources and please be aware that UNM will publish information on websites and email about any changes to our public health status and community response.

Support:

- *Student Health and Counseling* (SHAC) at (505) 277-3136. If you are having active respiratory symptoms (e.g., fever, cough, sore throat, etc.) AND need testing for COVID-19; OR If you recently tested positive and may need oral treatment, call SHAC.

- *LoboRESPECT Advocacy Center* (505) 277-2911 can offer help with contacting faculty and managing challenges that impact your UNM experience.

Accommodations

UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact Accessibility Resource Center at *arcsrvs@unm.edu* or by phone at 505-277-3506.

Support:

- Contact me at *jhogeveen@unm.edu* or in office/check-in hours and contact *Accessibility Resource Center* (*https://arc.unm.edu/)* at *arcsrvs@unm.edu* (505) 277-3506.

Credit-Hour Statement

This is a three credit-hour course. Class meets for two 75-minute sessions of direct instruction for 14 weeks during the Fall 2022 semester. Please plan for a *minimum* of six hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week.

Support:

- *Center for Academic Program Support* (CAPS). Many students have found that time management workshops can help them meet their goals (consult (*CAPS*) website under "services").

Title IX

Our classroom and our university should always be spaces of mutual respect, kindness, and support, without fear of discrimination, harassment, or violence. Should you ever need assistance or have concerns about incidents that violate this principle, please access the resources available to you on campus. Please note that, because UNM faculty, TAs, and GAs are considered "responsible employees" by the Department of Education, any disclosure of gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member, TA, or GA must be reported by that faculty member, TA, or GA to the university's Title IX coordinator. For more information on the campus policy regarding sexual misconduct, please see: *https://policy.unm.edu/university-policies/2000/2740.html*.

Support:

- *LoboRESPECT Advocacy Center* and the support services listed on its website, the *Women's Resource Center* and the *LGBTQ Resource Center* all offer confidential services and reporting.

Land Acknowledgement

Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico Pueblo, Navajo, and Apache since time

immemorial, have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.

Resource: *Division for Equity and Inclusion*.

Citizenship and/or Immigration Status

All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration's welcome is found on our website: *http://undocumented.unm.edu/*.

Respectful and Responsible Learning

We all have shared responsibility for ensuring that learning occurs safely and equitably. UNM has important policies to preserve and protect the academic community, especially policies on student grievances (Faculty Handbook D175 and D176), academic dishonesty (FH D100), and respectful campus (FH CO9). These are in the *Student Pathfinder* (*https://pathfinder.unm.edu*) and the *Faculty Handbook* (*https://handbook.unm.edu*). Please ask for help in understanding and avoiding plagiarism or academic dishonesty, which can both have very serious consequences.

Support:

- *Center for Academic Program Support* (CAPS). Many students have found that time management workshops can help them meet their goals (consult (*CAPS*) website under "services").

Connecting to Campus and Finding Support

UNM has many resources and centers to help you thrive, including *opportunities to get involved*, *mental health resources*, *academic support including tutoring*, *resource centers* for people like you, free food at *Lobo Food Pantry*, and *jobs on campus*. Your advisor, staff at the *resource centers* and *Dean of Students*, and I can help you find the right opportunities for you.