NATURAL RESOURCES 775
R PROGRAMMING FOR NATURAL RESOURCES
SPRING SEMESTER 2024, 3 CREDITS

Instructor: Dr. Jared Homola
Office: 163 CNR
Office Hours: By request, email jhomola@uwsp.edu. Also available via Microsoft Teams chat.
Office Phone: (715) 346–3150

Class website: https://jaredhomola.github.io/RforNatRes/

Classroom: Trainer Natural Resources Building (TNR) 356

Time: Tuesday and Thursday 11:00am-12:15pm

Objectives: At the completion of the course, students will be able to: (1) understand the basic components of R such as functions and data structures; (2) read in and process data; (3) write functions, loops, and conditionals; (4) create a wide variety of data visualizations; and (5) code basic statistics that are commonly used in biology. Most importantly, this course will teach students how to think like a programmer and how to properly use help documents. The overall goal of the course is to give students the tools necessary to tackle new tasks in R that were not covered in the course.

Textbook: R for Data Science: Import, Tidy, Transform, Visualize, and Model Data (2nd edition) Hadley Wickham, Mine Çetinkaya-Rundel, and Garrett Grolemund. Free digital version available at https://r4ds.hadley.nz/. Additional readings from various online sources.

Format: Lectures will discuss data science principles and R syntax. Reading assignments will be assigned for most lectures. Lab periods will generally consist of programming exercises that build on lectures and prepare students for the homework assignments. The grade for this class will be based entirely on homework assignments. There will be one homework assignment each week. Two of the homework assignments will be larger in scope and will serve as a midterm and final. The final homework will require data analysis of the students' own data and a short write up formatted like a scientific paper. If the student does not have their own data, a dataset will be provided. Homework assignments will be assigned after lab on each week and will be due before class the following Wednesday.

Grading: Assignments will not be accepted if they are turned in after the due date, other than for extenuating circumstances such as a family or health emergency. Final grades for the course will be awarded using the following minimum values: A = 93%; A- = 90%; B+ = 87%; B = 83%; B- = 80%; C+ = 77%; C = 73%; C- = 70%; D+ = 67%; D = 60%; F = <60%. The final class grade will be based entirely on homework assignments. Normal homework assignments will be worth 20 points and the larger homework assignments will be worth 60 points.

Integrity: Academic dishonesty in any form will not be tolerated. You will adhere to the Student Academic Standards outlined in Chapter UWS 14 of the Wisconsin Administrative Code (http://www.uwsp.edu/dos/Documents/CommunityRights.pdf). Cheating or plagiarism related to any of the course assessments will result in a score of zero for that assessment.

Inclusivity: It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally, or for other students or student groups. If you have experienced a bias incident (an act of conduct, speech, or expression to which a bias motive is evident as a contributing factor regardless of whether the act is criminal) at UWSP, you have the right to report it to the Dean of Students office directly at dos@uwsp.edu.

Tentative Schedule

Section I: Intro to coding in R
Week 1	Jan 23/24	Introduction to R, basic math and objects
Week 2	Jan 30*/Feb 1	Data types, finding help, coding etiquette, & workflows
Week 3	Feb 6/8	Tidy data and intro to the Tidyverse
Week 4	Feb 13/15	Data wrangling I
Week 5	Feb 20/22	Data wrangling II
Week 6	Feb 27/Feb 29	Additional Tidyverse packages
Week 7	Mar 5/7	Iterating I (For loops/functions/purrr)

Assign midterm homework: Due by midnight on Sun March 24
Week 8	Mar 12/14	Iterating II (For loops/functions/purrr)

Section II: Data visualization
	Spring break	
Week 9	Mar 26/28	Data visualization I: Intro to ggplot2
Week 10	Apr 2/4	Data visualization II: Additional ggplot2 topics
Week 11	Apr 9/11	Data visualization III: Mapping

Section III: Statistical applications
Week 12	Apr 16/18	Basic regressions
Week 13	Apr 23/25	Advanced regressions
Week 14	Apr 30/May 2	Simulations: resampling/bootstrapping

Assign final homework: Due by midnight on Sun May 12
Week 15	May 7/9	Multivariate statistics

*Jan 30 meeting will be online and asynchronous.