PSYCH 548
Introduction to R Programming
Summer 2021
Tues/Thurs 1:10-2:40pm

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Course Slack: click to join
Zoom: https://washington.zoom.us/j/93294105848

Software

R (Version 4.0+; https://cloud.r-project.org/)
RStudio (https://www.rstudio.com/products/rstudio/download/)

R and RStudio are both free to use and can be installed on most modern operating systems. However, if you have an older operating system that cannot accommodate the most recent versions of this software, you can use the CSDE's Windows or Unix servers, which are available at no extra cost to all students who pay the UW Student Technology Fee.

Course Objectives

The overarching goal of this course is to provide you with a foundational knowledge of programming in R. By the end of the quarter, you will be able to confidently approach all your data tasks, from data cleaning all the way to statistical analysis and report generation. This course will not teach you everything there is to know about R (that would be impossible!), however you will have the knowledge and skills necessary to continue developing your R prowess as your progress in your career.

Schedule

	Content	Homework
Week 1	**June 22 (lecture)** ▪ Course overview ▪ Intro to R and RStudio ▪ Packages **June 24 (lab)** ▪ Orientation to Stack Overflow (and practice) ▪ Create markdown document with multiple features (also your HW)	Assignment 1 (due Fri 6/29)

Week 2	**June 29 (lecture)** ▪ Fundamentals of R **July 1 (lab)** ▪ R style guide ▪ Practice working with data structures	Assignment 2 (due Fri 7/6)
Week 3	**June 6 (lecture)** ▪ Control structures (`if`/`else`, `switch`, `for`, `while`, `repeat`, `break`, `next`) ▪ Vectorization **July 8 (lab)** ▪ Practice with loops and conditional statements	Assignment 3 due (7/13)
Week 4	**July 13 (lecture)** ▪ Function basics ▪ User-defined functions ▪ Classes and methods ▪ The `apply` family of functions **July 15 (lab)** ▪ Practice using `apply` et al. ▪ Create your own user-defined functions ▪ Practicing debugging	Assignment 4 (due 7/20)
Week 5	**July 20 (lecture)** ▪ Importing/exporting data ▪ Data cleaning ▪ Working with strings (regular expressions) **July 22 (lab)** ▪ Import, clean, and transform raw data ▪ Practice with regular expressions	Assignment 5 (due 7/27)
Week 6	**July 27 (lecture)** ▪ Data manipulation and summarizing **July 29 (lab)** ▪ Practice manipulating, merging, and summarizing data	Assignment 6 (due 8/3)
Week 7	**August 3 (lecture)** ▪ Data visualization using base R **August 5 (lab)** ▪ User-defined functions and base R plots	Assignment 7 (due 8/10)
Week 8	**August 10 (lecture)** ▪ Data visualization using `ggplot2` **August 12 (lab)** ▪ Creating custom `ggplot2` themes	Assignment 8 (due 8/17)

Week 9	**August 17 (lecture)** ▪ Intro to statistical computing with R (formulas, functions, and packages) ▪ Git, `renv` **August 19 (lab)** ▪ Simulating data in R	Assignment 9 (due 8/24)

Elements

Lecture

Lectures (every Tuesday) will focus largely on covering the foundational knowledge of programming in R. Although the dynamic of lecture is such that I am doing most of the talking, you are highly encouraged to ask questions throughout to solidify your own, and your fellow students', understanding of the material.

Lab

Labs (every Thursday) will focus on implementing the R skills covered in lecture. Sometimes I will cover additional material in lab, but most of the time this will be a space to work with your fellow students and myself on novel programming tasks (lab exercises), your weekly assignments, and to get any miscellaneous R questions you may have answered.

Assignments

Each week you will be assigned homework that will help you master the concepts covered in lecture and lab. These assignments are designed to be challenging. Depending on your previous experience with programming, you should expect to spend a couple of hours each week on homework.

My hope is that these assignments will prepare you as much as possible for the "real world" of statistical computing. In approaching data tasks, it is often helpful to have examples of code that you have written in the past to perform a similar task. These assignments will likely function in that way. However, if you are facing a task "in real life" that is similar to a homework question (e.g., creating the same/similar figure for your manuscript), please get in touch with me and we can figure out a way to work that into your weekly assignment instead.

Helpful Resources

- R for Data Science online textbook by Garrett Grolemund and Hadley Wickham

- Advanced R online textbook by Hadley Wickham
- ggplot2 online textbook
- YaRrr: The Pirate's Guide to R online textbook
- Stack Overflow forums (https://stackoverflow.com)

Grading

I believe that, at this point in our education and careers, we are responsible for our own learning. My job as the instructor for this course is to provide you with the tools and resources that you need to be as successful as you want want to be. However, we all have multiple demands placed on us and should have the ability to respond to those demands in a way that most effectively advances us toward our goals.

Learning how to program in R is challenging, especially if you do not have a background in coding (although many established software engineers see R as especially difficult to learn). As such, developing mastery involves putting in a lot of time and effort, as well as finding ways to work through periods of intense frustration. Working through this frustration is not only a rite of passage to becoming an R coder, but will help you develop your skills more effectively.

I encourage you to put as much time and effort as you want and are able to into this course. The more you put into it, the more you will get out of it. The only expectation I have is that you attempt each assignment in earnest. If you need extensions on any of the assignment due dates please do not hesitate to get in touch with me.

Religious Accommodations

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/). Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-request/).