

R bootcamp - August 2020: Syllabus/schedule

July 15, 2020

Unless otherwise noted, modules are about 90 minutes long: 50 minutes for presentation, 30 minutes for breakout and 10 minutes for discussion of solutions.

- Session 1 (Monday) (learning R)
 - Module 0: Introduction, what is R, starting R, why R? why not R? (15 minutes)
 - Module 1: Basics of R, with Rstudio (90 minutes)
 - * R as a calculator
 - * helpful shortcuts: tab-complete, up arrow, Ctrl-{up arrow}
 - * vectors and indexing and subset assignment
 - * some basic functions; help()
 - * vectorized calculations, comparisons
 - * basic R objects: vectors, matrices, dataframes, lists
 - * basic graphics
 - * breakout problems
 - Break (15 minutes)
 - Module 2: Managing R and your analyses (60 minutes)
 - * managing R objects, the R workspace
 - * using packages (installing, loading, namespaces)
 - * the working directory and basic file reading/writing
 - * more on reading data into R
 - * Git, Github and version control
 - * getting R help online

- * breakout problems
- Break (15 minutes)
- Module 3: Working with data (60 minutes)
 - * dataframes/matrices
 - * attributes, missing values and factors
 - * subsetting
 - * breakout problems
- Session 2 (Tuesday) **TRACK 2 splits from TRACK 1**
 - Track 2: Session 2a (Evan)
 - * Revisit variables, data types, data structures
 - Break (30 minutes)
 - Track 2: Session 2b (Evan)
 - * Revisit data frames, subsetting, and data summarization
- Session 3 (Wednesday) (data analysis and plotting using the Tidyverse)

TRACK 2 rejoins TRACK 1

 - Module 6: Data manipulation using the Tidyverse
 - * stratified analyses: groupwise operations and split-apply-combine using dplyr
 - reshaping and tidying data
 - breakout problems/homework
 - * Break (30 minutes)
 - * Module 7: Graphics
 - overview of graphics in R
 - ggplot2
 - organizing and exporting graphics (vector/raster formats)
 - breakout problems
- Session 4 (Thursday) (more advanced topics)

TRACK 2 splits from TRACK 1

 - Track 2: Session 4a (Evan)

- * Revisit base graphics and ggplot, data analysis
- Break (30 minutes)
- Track 2: Session 4b (Evan)
 - * Programming: for loops, if-then-else conditionals, functions
 - * Automation example: Monte Carlo simulation and the birthday problem