Example 8-week R coding tutorial for undergraduate students

The tutorial has been generalized to teach useful R skills independent of research field/project

Week 1: Introduction to R and to the project

Reading material:
Chapter 1 - Introduction to Data Science: Getting started with R and RStudio
Chapter 2 - Introduction to Data Science: R Basics
Chapter 3 - Introduction to Data Science: R Programming

Coding challenges:
Complete the exercises in Chapter 2 and 3 of Introduction to Data Science

Bonus coding challenges:
Basics of programming in R - swirl course

Week 2: Data wrangling

Reading material:
Chapter 4 - Introduction to Data Science: The tidyverse
Chapter 5 - Introduction to Data Science: Data import

Bonus reading material:
Data wrangling in R
Wrangling unruly data
Joining data tables

Coding challenges:
Complete the exercises in Chapter 4 and 5 of Introduction to Data Science
Data carpentry dplyr exercises
Data wrangling exercises

Bonus challenges:
Getting and cleaning data - swirl course

Week 3: Data visualization with ggplot2

Main package documentation:
ggplot2 - for customizable graphs

Reading material:
Chapter 6 - Introduction to Data Science: Introduction to data visualization

Chapter 7 - [Introduction to Data Science: ggplot2](#)
[10 levels of ggplot, from basic to beautiful](#)

Coding exercises:
Exercises from [Chapter 7](#) of Introduction to Data Science
[Basic graphics with ggplot exercises](#)
[How to plot with ggplot and patchwork exercises](#)

Bonus material:
Browse the [ggplot2 gallery](#) for inspiration!
[A ggplot2 cheatsheet](#)

Now apply these skills to make graphs for your own research project!

Week 4: Interactive data visualization with plotly

Main package documentation:
[plotly](#) - interactive graphing library

Reading material:
Chapters 1-6 - [Plotly R](#) book

Coding challenges:
[Getting started with plotly exercises](#)
[Advanced plots and features](#)

Now apply these skills to make interactive visualizations in plotly for your own research project!

Week 5: Introduction to descriptive analytics and statistics

Main package documentation:
[R stats](#) package

Reading material:
Chapter 11 - [Introduction to Data Science: Robust summaries](#)
Chapter 12 - [Introduction to Data Science: Statistics with R](#)
[Descriptive statistics in R](#) (using your new ggplot2 skills!)

Coding challenges:
Exercises from [Chapters 11 and 12](#) of Introduction to Data Science

Bonus coding challenges:
swirl course - [Regression models](#)

swirl course - [Statistical inference](#)

Now apply these skills to do some descriptive analysis and statistics for your own dataset!

Week 6: Basics of R Shiny web applications I

Main package documentation:
[R Shiny](#) - for building interactive web apps
[flexdashboard](#) - use Markdown syntax to build interactive dashboards

Reading material:
[The basic parts of a Shiny app](#)

Bonus:
For inspiration, see the [R Shiny app gallery](#)

Coding challenges:
[Building a Shiny apps exercises](#)
[How to create a flexdashboard: exercises](#)

Now build a basic Shiny app for your own research purposes!

Week 7: Basics of R Shiny web applications II

Main package documentation:
[R Shiny](#) - for building interactive web apps
[flexdashboard](#) - use Markdown syntax to build interactive dashboards

Reading/lecture material:
[Reactivity 101](#)
[Reactivity in Shiny](#)

Coding challenges:
[Shiny app layouts](#) exercises
[Interactive data tables](#) exercises

Make improvements to your Shiny app!

Week 8: Geospatial mapping (optional, if relevant for research project)

Main package documentation:
[ggmap](#) - spatial visualization

[leaflet](#) - interactive maps

Coding challenges:
[Leaflet mapping exercise 1](#)
[Leaflet mapping exercises 2](#)

Now apply these skills to make a map using data for your research project!
Or choose to learn an additional topic in R that is more relevant to your research.