

Each class will have associated exercises during the lecture portion for students to complete. Students will submit an R history file at the end of each class to show that they followed along with the class. We will discuss how to export R history in Class 1. After Class 4, students will submit a knitted RMD instead of R history.

1 Class 1: R Motivation

Students will hopefully have installed R Studio prior to the start of this class, but this class will have time budgeted to make sure students all have it installed on their machine. We will spend time motivating why R is such a commonly used and powerful language in statistical programming and how it will be useful for them in their future endeavors (public policy applications, etc.). We will go through the interface of R Studio to better understand the environment and learn how to do simple variable assignment, arithmetic, and logical comparison.

1.1 Learning Objectives

SWBAT:

- state why R is a useful language for statistical programming,
- perform simple variable assignment and determine variable type; and
- make use of algebraic logical operators.

2 Class 2: Installing Packages and Reading Data

In this lesson, we will go over how to install packages and load them using the `library()` function. We will spend some time understanding what a package is (a collection of functions) by making use of some of the functions that exist in the tidyverse library. Students will learn how to check their working directory and set it to a file location to read in data. Once we have read in data, we will go through the process of accessing our data to view attributes.

2.1 Learning Objectives

SWBAT:

- install packages such as tidyverse and load them using `library()`,
- set their working directory and read in data; and
- view attributes of data and access data by indexing, name, and logical vectors.

3 Class 3: Review Reading Data and Basic Manipulation

This lesson is about making sure students can recall the process of reading in and accessing their data. We will introduce the pipe operator and how they can use it to organize their code. We will discuss several important functions and their usefulness in data manipulation and analysis.

3.1 Learning Objectives

SWBAT:

- read in data of different file types,
- use functions like `sapply()`, `select()`, `arrange()`, `summarize()`, and `mutate()`; and
- understand how to use the pipe operator to write longer and more organized code.

4 Class 4: R Markdown File, Knitting, and a Data Structures

Up to this point students have been using an R script file to write all of their code. In this lecture we will discuss how to create an R Markdown File and how we can use it to knit our code and output to PDF or HTML. We will also talk more about the difference between lists, vectors, dataframes, tibbles

4.1 Learning Objectives

SWBAT:

- create an R Markdown File,
- knit code and outputs to HTML and PDF; and
- initialize vectors and other data structures.

5 Class 5: More Data Manipulation and Analysis

Students will be introduced to more complicated chaining functions for using the pipe operator. They will also use logical operators to filter data and we will discuss the importance of order in chaining dplyr verbs together and how different order can result in different results.

5.1 Learning Objectives

SWBAT:

- filter data using filter() and logical operators; and
- perform data analysis using longer chained statements.

6 Class 6: Data Cleaning and Debugging

This class begins with an overview of everything we've seen thus far. We will talk about different strategies for data cleaning such as how to deal with missing data and changing variable types. We will also talk about debugging strategies for common problems.

6.1 Learning Objectives

SWBAT:

- explore a dataset they've never seen and perform simple analysis of key features,
- handle missing data and miscoded variable types; and
- locate errors in code and use general problem solving strategies to debug.