# POD 3 Bootcamp Curriculum

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## Week 1: Tutorial on R/Rstudio and “Cheatsheets”

Purpose Statement: This lesson is focused on orienting learners to R and RStudio (The R IDE). We will go over how to use the many default libraries in R and how to install popular packages for us all within RStudio Learners have different goals and sometimes it is difficult to link how R can help a learner achieve that goal. To this end, we will connect learners with all the available “Cheatsheets” that can provide an overview of most of R’s functionality, from data manipulation to data visualization to deep learning.

<https://posit.co/resources/cheatsheets/>

## Week 2: Importing data into R (in all its formats)

Purpose Statement: The first step to using R for research is to import one’s data in R’s memory. There are good base functions to import basic file types such as .csv files, but many times the format and file type of the data we wish to import can vary in a way base functions in R do not support. We will go over how to import data of different files types, including: SPSS files, SAS files, Excel spreadsheets, and even using library APIs to import data from REDCap databases and googlesheets.

## Week 3: Data Cleaning and Manipulation

Purpose Statement: Once data is loaded into R it rarely is in the structure or format that is ready for analysis. In this lesson we will provide the best practices for handling missing data, converting data into different variable types, and converting data from wide to long and from long to wide formats.

## Week 4: Data Visualization and Table Generation

Purpose Statement: A good sanity check before plugging in your now clean and formatted data into a statistical model is to visualize it. This is good for a priori check of outliers, normality, and overall trends you may or may not expect. We will also present methods for compiling data into modifiable demographic tables that are publication ready.

## Week 5: Statistical Analysis

Purpose Statement: Now that you have imported, cleaned, manipulated, and visually checked your data you are ready to confidentially analyze it. In this lesson we will present how to use base functions in R to run general and generalize linear models for statistical analysis. Additionally, we will go over how to use a library specific for mixed effects models for repeated measures designs and the incorporation of random effects.

## Week 6: R Markdown and Jupyter Notebooks

Purpose Statement: You now have the makings of a working analytical pipeline that fits your data and your research question. One day you will want to share it with the world! In this lesson we will present different methods for sharing your code either a vignette or notebook that makes your work accessible to a variety of audiences.

## Weeks 7 – 8: Personalize Lessons!!

Purpose Statement: We have now covered the basics on all things R that are necessary for reproducible research in rehabilitation science. Now it is your turn to tell us what you would like to learn next! Don’t be afraid to think big or aim for a deep dive into one specific area! Even if it is something that we are unfamiliar with, will make sure to connect you with someone in the ReproRehab cohort that can help!