

Introduction to R 0 credits/0 ECTS

No instructor, self-paced course
Video lecture by Heide Jackson, PhD

Short Course Description

This short course will provide an introduction to R, a language and environment for statistical computing and graphics.

Course Objectives

By the end of the course, students will...

- install R and Rstudio and be aware of general R vocabulary
- create different types of objects
- import, manipulate and export data
- summarize data statistically and graphically
- run basic statistical models
- find new packages and packages in the Tidyverse.

Prerequisites

No prerequisites.

Class Structure and Course Concept

This is an online self-paced course. It covers the same material and content as an on-site course but runs differently. In this course, you are responsible for watching video-recorded lectures and reading the required literature for each unit as well as completing any exercises and exams provided.

Grading

This course will be ungraded. Quizzes are offered to allow students to assess their knowledge of each unit.

Long Course Description

R is a powerful language and environment for statistical computing and graphics. This short course will introduce students to R with an emphasis on learning how to install and work in R as accessed through RStudio, a useful wrapper for accessing R. The course will be organized into four general units: 1. a general introduction to R and some useful R vocabulary, 2. a guide for bringing in, manipulating, and exporting data sets, 3. an overview of how to summarize data in R statistically and graphically and 4. a discussion of statistical modeling and advanced topics including designing custom R functions and learning about new R packages. The course is designed to be cumulative, and several topics introduced early on will be referenced in later class discussions.

A noted strength and limitation of R is that its functionality is always changing. As such, provided R scripts, particularly those that rely on packages, may not work exactly as shown on the video or may not work at all. This is a hazard of working in R; however, these materials should hopefully be a useful jumping off point for future exploration into R.

Readings

The primary course materials are recorded lectures and R scripts. Two versions of these scripts are available: the scripts as shown on the videos and scripts with additional annotation and examples of important related topics. Additional optional readings are posted on the course website.

Academic Conduct

Clear definitions of the forms of academic misconduct, including cheating and plagiarism, as well as information about disciplinary sanctions for academic misconduct may be found at

<https://www.president.umd.edu/sites/president.umd.edu/files/documents/policies/III-100A.pdf> (University of Maryland)

and in the MBS Honor Code, signed at the beginning of the program.

Knowledge of these rules is the responsibility of the student and ignorance of them does not excuse misconduct. The student is expected to be familiar with these guidelines before submitting any written work or taking any exams in this course. Lack of familiarity with these rules in no way constitutes an excuse for acts of misconduct. Charges of plagiarism and other forms of academic misconduct will be dealt with very seriously and may result in oral or written reprimands, a lower or failing grade on the assignment, a lower or failing grade for the course, suspension, and/or, in some cases, expulsion from the university.

Accommodations for Students with Disabilities

In order to receive services, students at the University of Maryland must contact the Accessibility & Disability Service (ADS) office to register in person for services. Please call the office to set up an appointment to register with an ADS counselor. Contact the ADS office at 301.314.7682; <https://www.counseling.umd.edu/ads/>.

Students at the Mannheim Business School should contact the Commissioner and Counsellor for Disabled Students and Students with Chronic Illnesses at http://www.uni-mannheim.de/studienbueros/english/counselling/disabled_persons_and_persons_with_chronic_illnesses/

Course Evaluation

In an effort to improve the learning experience for students in our online courses, students will be invited to participate in an online course evaluation at the end of the course. Participation is entirely voluntary and highly appreciated.

Suggested Class Schedule

Please note that assignments are subject to change. Information (e.g., articles and assignments) posted to the course website supersedes the information noted here.

Unit 1: Introduction to R and R Studio

Videos:

- A. What is R and Why is it used?
- B. Installing R, R Studio, and Rtools on Windows Machines
- C. Some Basic R vocabulary Part 1
- D. Some Basic R vocabulary Part 2
- E. Tour of R Studio
- F. Basic commands

Quiz: Online quiz 1

Recommended Readings:

"2 History and Overview of R." R Programming for Data Science.

Roger D. Peng. 2018. <https://bookdown.org/rdpeng/rprogdatascience/history-and-overview-of-r.html>

"4 R Nuts and Bolts." R Programming for Data Science. Roger D. Peng. 2018. <https://bookdown.org/rdpeng/rprogdatascience/r-nuts-and-bolts.html>

"3 Vectors." Advanced R. Hadley Wickham. 2014.

<https://adv-r.hadley.nz/vectors-chap.html#introduction-2>.

Unit 2: Working with Data in R

Videos:

- A. Common Data Types
- B. Options for Loading in Data
- C. Data Cleaning in R: Finding Variables and Observations
- D. Data Cleaning in R: Using Base R
- E. Data Cleaning in R: Using Tidy R
- F. Saving your Data and Workspace

Quiz: Online quiz 2

Recommended Readings:

"11 Data Import." R for Data Science. Hadley Wickham. 2017. <https://r4ds.had.co.nz/data-import.html>.

“12 Tidy Data.” R for Data Science. Hadley Wickham. 2017. <https://r4ds.had.co.nz/tidy-data.html>.

Unit 3: Summarizing and Graphing Data in R

Videos:

- A. Options for summarizing data
- B. Creating and Exporting Tables
- C. Graphing in Base R
- D. Saving a Graph in Base R
- E. An Introduction to ggplot

Quiz: Online quiz 3

Recommended Readings:

“5 Data Transformation.” R for Data Science. Hadley Wickham. 2017. <https://r4ds.had.co.nz/transform.html>.

“3 Data Visualisation.” R for Data Science. Hadley Wickham. 2017. <https://r4ds.had.co.nz/data-visualisation.html>.

Unit 4: A Preview of Advanced Topics

Videos:

- A. An Introduction to Some Basic Statistical Models
- B. Working with Regression Continued
- C. Work with Functions
- D. Simulating Data in R
- E. Other R Packages and Why to Use Them

Quiz: Online quiz 4

Recommended Readings:

“Chapter 9 Statistical Modelling.” The R Book. Michael Crawley. 2012. <https://www.cs.upc.edu/~robert/teaching/estadistica/TheRBook.pdf>.

“22 Debugging.” Advanced R. Hadley Wickham. 2014. <https://adv-r.hadley.nz/debugging.html>.

“Introduction.” R for Data Science. Hadley Wickham. 2017. <https://r4ds.had.co.nz/explore-intro.html>.

R Packages. Hadley Wickham. 2015. <http://r-pkgs.had.co.nz/>.