Statistical Computing (Part 1/2) Data Management and Graphics in R

Half-Course for non-student learners
(Half course, 6 weeks)
Course information sheet 2019-20

The course introduces learners to data visualisation and data management in the statistical software environment R.

Prerequisite Knowledge

The course requires no prerequisite knowledge. However, some of the examples require a basic understanding of matrix algebra.
The course is suitable for learners with no prior experience of programming, however learners with no prior experience in programming should expect a larger time commitment in order to fully benefit from the course.

Intended Learning Outcomes

By the end of this course learners will be able to:
- recognise and make appropriate use of different types of data structures;
- manipulate data sets in R; and
- use R to create figures and graphs.

Syllabus

Week 1
- Installing R and RStudio
- Accessing R in the cloud
- Basics of scientific computing
- Variables and R as a calculator

Week 2
- Logical operators
- Vectors, lists and matrices
- Other common data types

Week 3
- Data frames
- Transforming, subsetting and merging data frames
- Reading/writing data from/to files

Week 4
- Efficient data management using `tidyverse`
- `tibbles`
- Transforming, subsetting and merging data frames using `dplyr`
- Reshaping data using `tidyr`

Week 5
- R graphics
- Data visualisation in R

Week 6
- Advanced graphics using `ggplot2`

Online Learning

The course is delivered by online distance learning and consists of
- Weekly live sessions with tutor(s)
- Weekly learning material (reading material, videos, exercises with model answers)
- Bookable one-to-one sessions with tutor(s)

Textbooks

G. Grolemund, H. Wickham. R for Data Science. O'Reilly Media.
https://r4ds.had.co.nz/
W. J. Brown, D. J. Murdoch. A First Course in Statistical Programming with R. Cambridge University Press.
P. Daalgard. Introductory Statistics with R. Springer.

Assessment

Courses for non-student learners have quizzes which allow you to check your progress. You need to attempt at least one quiz to obtain a certificate of attendance.

Hardware and Software Requirements

To take our courses all you need is a computer with an internet connection, an up-to-date version of a standard browser (such as Google Chrome, Firefox, Safari, Internet Explorer or Microsoft Edge) and a PDF reader (such as Acrobat Reader).
We encourage learners to install R and RStudio and provide detailed installation instructions, but learners can also use free cloud-based services (RStudio Cloud) if they prefer not to install software on their computer.
Learners need to install Zoom for participating in videoconferencing sessions. We recommend the use of a headset for videoconferencing sessions.

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