

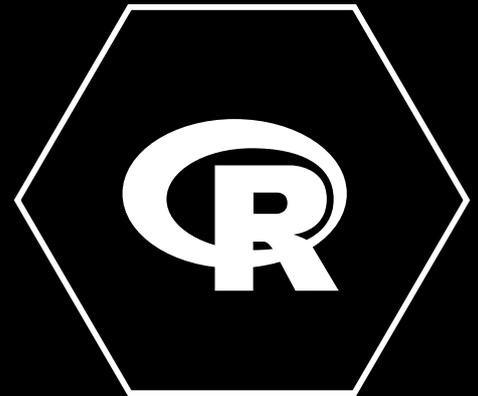
Statistical Computing (Part 2/2)

Advanced Programming, Shiny apps and automatic reporting using RMarkdown

Course for non-student learners

(Half course, 5 weeks)

Course information sheet 2019-20



The course introduces learners to programming in the statistical software environment R.

Prerequisite Knowledge

The course requires learners to have basic experience of using R for data management and data visualisation.

Learners with no prior experience of using R should take part 1 of this course first.

Intended Learning Outcomes

By the end of this course learners will be able to:

- identify and implement appropriate control structures to solve a particular programming problem;
- design and write functions in R and implement simple iterative algorithms;
- structure complex programming problems into functional units and implement these;
- carry out extended programming tasks and produce clearly annotated listing of their code;
- author reports with embedded code using technologies such as Sweave or knitr; and
- develop and deploy R Shiny apps.

Syllabus

Week 1

- `if` statements and `ifelse`
- Using loops (`for` and `while`) for iterative and repeated computations

Week 2

- Writing R functions
- Structuring your code efficiently using functions
- Debugging

Week 3

- Authoring data-driven interactive webapps using `shiny`

Week 4

- Authoring automatic reports using `knitr` and `rmarkdown`
- Reproducible data science

Week 5

- Basics of object-oriented programming
- Creating classes (“S3”) in R
- Creating R6 classes

Online Learning

The course is delivered by on-line 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. Golemund, H. Wickham. R for Data Science. O’Reilly Media.

<https://r4ds.had.co.nz/>

H. Wickham. Advanced R. CRC Press.

<http://adv-r.had.co.nz/>

W. J. Brown, D. J. Murdoch. A First Course in Statistical Programming with R. Cambridge University Press.

P. Daalgaard. Introductory Statistics with R. Springer.

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.

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.

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