

# **CODING IN R**

**Silvia Montagna**

## **Learning Objectives**

The module is aimed at providing students with a basic knowledge of the R software. At the end of the module, students should possess a basic set of tools to undertake their own data analysis in most standard cases. Moreover, they should be comfortable exploring new R packages, when required, for more advanced applications.

## **Prerequisites**

There are no prerequisites for this course, although familiarity with another programming language will facilitate learning.

## **Course Content**

The module is an introduction to the R language and mainly covers the following topics:

- 1) Basic data types
- 2) Data structures
- 3) Control structures/loops and functions
- 4) Reading and writing data
- 5) Tools for data manipulation (dplyr package), data visualization (ggplot2), and functional programming (purrr)
- 6) Web scraping (if time allows)

## **Course Methodology**

The course consists of 16 hours of computer lab which, for the academic year 2020/2021, will be held remotely via Zoom. Students will be taught how to write their own code through concrete examples. Programming is a skill that is best learned by doing, so as much as possible students will be working on a variety of tasks and activities throughout each lecture. Students are encouraged to actively interact in class and will be asked to work on problem sets assigned during the lessons.

## **R / RStudio**

R is a programming language that is especially powerful for data exploration, visualisation, and statistical analysis. To interact with R we will primarily be using RStudio, an interactive

development environment (IDE). It is recommended students install R (<http://www.r-project.org/>) and RStudio (<https://rstudio.com/>) on their own laptop before the beginning of the course.

### **Textbooks**

There are no required textbooks for this course, the following textbooks are recommended for supplementary and reference purposes:

- [Advanced R](#) - Wickham - Chapman and Hall/CRC, 2014 (978-1466586963)
- [R Packages](#) - Wickham - O'Reilly, 2015 (978-1491910597)
- [R for Data Science](#) - Golemund, Wickham - O'Reilly, 2016 (978-1491910399)

### **About the Instructor**

Silvia Montagna obtained a PhD in Statistical Science at Duke University (USA) in November 2013. She then moved to the University of Warwick (UK) as a post-doctoral research fellow, and worked on developing statistical methodology for neuroimaging meta-analysis data. In January 2017, she joined the School of Mathematics, Statistics, and Actuarial Science at the University of Kent as Lecturer in Statistics. Since January 2018, Silvia is Assistant Professor in Statistics in the ESOMAS Department at the University of Turin. Her research interests are in developing Bayesian statistical methodology motivated by high-dimensional applications.