

STATISTICS AND PROGRAMMING WITH R FOR BIOLOGICAL SCIENCES

CIIMAR – Universidade do Porto

Course program 50 hours; 11-22 March 2019

Module I: Introduction to R language (11 - 15 March) 25 hours

Session 1. 10:00 – 15:00 h

1.1 Basics of R language: Introductions. First things to know. 10:00 – 12:15 h

Break 12:15 – 13:00 h

1.2 Basics of R language: types of objects. 13:00 – 14:00 h

1.3 Exercises. 14:00 – 15:00 h

Session 2. 10:00 – 15:00 h

2.1 Basics of R language: Useful functions. Indexing vectors, matrices, arrays and data frames. 10:00 – 12:15 h

Break 12:15 – 13:00 h

2.2 Basics of R language: indexing vectors, matrices, arrays and data frames. 13:00 – 14:00 h

2.3 Exercises. 14:00 – 15:00 h

Session 3. 10:00 – 15:00 h

3.1 Basics of R language: Loops. Functions of the “apply family” and related 10:00 – 12:15 h

Break 12:15 – 13:00 h

3.2 Basics of R language: functions of the “apply family” and related. 13:00 – 14:00 h

3.3 Exercises. 14:00 – 15:00 h

Session 4. 10:00 – 15:00 h

4.1 Basics of R language: Importing and exporting data. 10:00 – 12:15 h

Break 12:15 – 13:00 h

4.2 Exercises. 13:00 – 14:00 h

4.3 Basics of R language: graphics. 14:00 – 15:00 h

Session 5. 10:00 – 15:00 h

5.1 Basics of R language: graphics 10:00 – 12:15 h

Break 12:15 – 13:00 h

5.2 Basics of R language: graphics. 13:00 – 14:00 h

5.3 Exercises. 14:00 – 15:00 h

Module II: Main statistical modeling frameworks (18 - 22 March) 25 hours

Session 1. 10:00 – 15:00 h

1.1 Descriptive statistics and distributions 10:00 – 12:15 h

Break 12:15 – 13:00 h

1.2 Linear regression. 13:00 – 14:00 h

1.3 Exercises. 14:00 – 15:00 h

Session 2. 10:00 – 15:00 h

2.1 Non-linear regression. 10:00 – 12:15 h

Break 12:15 – 13:00 h

2.2 Non-parametric regression. 13:00 – 14:00 h

2.3 Exercises. 14:00 – 15:00 h

Session 3. 10:00 – 15:00 h

3.1 Main frameworks of statistical inference. Tests for contrast of hypothesis 10:00 – 12:15 h

Break 12:15 – 13:00 h

3.2 General linear model. 13:00 – 14:00 h

3.3 General linear model. 14:00 – 15:00 h

Session 4. 10:00 – 15:00 h

4.1 Exercises. 10:00 – 12:15 h

Break 12:15 – 13:00 h

4.2 Mixed effects models. 13:00 – 14:00 h

4.3 Exercises. 14:00 – 15:00 h

Session 5. 10:00 – 15:00 h

5.1 Generalized linear models 10:00 – 12:15 h

Break 12:15 – 13:00 h

5.2 GAM models. 13:00 – 14:00 h

5.3 Exercises. 14:00 – 15:00 h

Course location: Faculdade de Ciências, Universidade do Porto.

Classroom: Sala de Formação, Edifício FC6 (Ciências dos computadores).

Map:

[https://www.google.pt/maps/place/Faculdade+de+Ciências+da+Universidade+do+Porto+\(Edif%3%ADcio+de+Ciências+dos+Computadores+--+FC6\)/@41.1516327,-8.6386992,16z/data=!4m8!1m2!2m1!1sFAculdade+de+CIências,+Universidade+do+PORto,+edifici+o+FC6!3m4!1s0x0:0x80de4dd3ea6443c2!8m2!3d41.1525498!4d-8.6404976?hl=gl&authuser=0](https://www.google.pt/maps/place/Faculdade+de+Ciências+da+Universidade+do+Porto+(Edif%3%ADcio+de+Ciências+dos+Computadores+--+FC6)/@41.1516327,-8.6386992,16z/data=!4m8!1m2!2m1!1sFAculdade+de+CIências,+Universidade+do+PORto,+edifici+o+FC6!3m4!1s0x0:0x80de4dd3ea6443c2!8m2!3d41.1525498!4d-8.6404976?hl=gl&authuser=0)

Docent: Aldo Barreiro Felpeto. CIIMAR.

Price: 80 €/week (CIIMAR/UP members) 100 €/week others.

Registration: after announcement, up to fill 20 available positions.

Registration, together with the payment information, is available in the CIIMAR website, through the link that is sent with the e-mail announcing the course.

Proof of payment required to book the place (send proof to aldo.barreiro@gmail.com).

Right after affective registration, a confirmatory e-mail will be sent.

Minimum audience required: 10 registrations 2 weeks before the course.

Important additional information:

- The course will be taught in English.

- Sessions Module I (first week) is independent from Module II (second week). Module I consist in an introduction to R language. Module II consist in learning how to work in R with the main statistical modeling frameworks. Those students without any previous background in R, are expected to attend Module I if they are planning to attend sessions 6 – 10 as well. However, those students with a fair background in R could attend only Module II.

- Students will need to use their own laptops for the course.

- all the information and materials necessary for the development of the course (instructions to install R and R packages, pdf with lessons content, scripts with examples and exercises, data for examples and exercises) will be made available for all the participants in the course through a link to the Open Science Framework website.

Contact: aldo.barreiro@gmail.com