

STATISTICS AND PROGRAMMING WITH R FOR BIOLOGICAL SCIENCES

CIIMAR – Universidade do Porto

Course program

48 hours; 30 September- 3 October 2019

Module I: Introduction to R language (30 September - 3 October) 24 hours

Session 1. 10:00 – 16:00 h (break from 12 to 13h)

- 1.1 Basics of R language: Introductions. First things to know.
- 1.2 Basics of R language: types of objects.
- 1.3 Exercises.

Session 2. 10:00 – 16:00 h (break from 12 to 13h)

- 2.1 Basics of R language: Useful functions. Indexing vectors, matrices, arrays and data frames.
- 2.2 Basics of R language: indexing vectors, matrices, arrays and data frames.
- 2.3 Exercises.

Session 3. 10:00 – 16:00 h (break from 12 to 13h)

- 3.1 Basics of R language: Loops. Functions of the “apply family” and related.
- 3.2 Basics of R language: functions of the “apply family” and related.
- 3.3 Exercises.
- 3.4 Basics of R language: Importing and exporting data.
- 3.5 Exercises.

Session 4. 10:00 – 16:00 h (break from 12 to 13h)

- 4.1 Basics of R language: graphics.
- 4.2 Exercises

Module II: Main statistical modeling frameworks (7 - 10 October) 24 hours

Session 1. 10:00 – 16:00 h

- 1.1 Descriptive statistics and distributions 10:00 – 12:15 h
- 1.2 Linear regression. 13:00 – 14:00 h
- 1.3 Exercises. 14:00 – 15:00 h
- 1.4 Non-linear regression. 10:00 – 12:15 h

Session 2. 10:00 – 16:00 h

- 2.1 Non-parametric regression. 13:00 – 14:00 h
- 2.2 Exercises. 14:00 – 15:00 h
- 2.3 Main frameworks of statistical inference. Tests for contrast of hypothesis 10:00 – 12:15 h
- 2.4 General linear model. 13:00 – 14:00 h

Session 3. 10:00 – 16:00 h

- 3.1 General linear model. 14:00 – 15:00 h
- 3.2 Exercises. 10:00 – 12:15 h
- 3.3 Mixed effects models. 13:00 – 14:00 h
- 3.4 Mixed effects models. 13:00 – 14:00 h
- 3.5 Exercises. 14:00 – 15:00 h

Session 4. 10:00 – 16:00 h

- 4.1 Generalized linear models 10:00 – 12:15 h
- 4.2 GAM models. 13:00 – 14:00 h
- 4.3 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,+edifício+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,+edifício+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: 5 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 platform.

Contact: aldo.barreiro@gmail.com