



## Bioinformatics analysis of biological sequences

**Lecturers:** Teresa Nogueira and Rita Ponce (external collaborators at cE3c-FCUL)

**Calendar:** February 24<sup>th</sup>-28<sup>th</sup> 2020

**Duration:** 36 hours

**Schedule:** 9h-12h30 and 14h-17h30, Monday-Thursday; 9h-13h and 14h-18h Friday

**Overview:** There are thousands of totally sequenced genomes freely available in the Internet. The number keeps on growing as at least one genome sequence is released every day. Large-scale sequencing requires bioinformatics analysis, whose algorithms will be the aim of this course, and that underlie the generation of reliable databases. Algorithms are also the basis of reliable sequence databases generation. An intelligent analysis of these databases allows the extraction of information and scientific knowledge. One of the most used tools for data mining is the software for the analysis and comparison of amino acids and nucleotide sequences that allow the identify and search for similarity. This course is aimed at researchers, molecular biology students, and health professionals who want to learn how to perform data mining of nucleic acids and proteins sequences to discover biological knowledge, or to implement new laboratory techniques in molecular biology, research or diagnostics.

**Objectives:** Provide the participants with knowledge about the biological sequences from reliable databases, as well as with autonomy and critical attitude in the use of bioinformatics software freely available in the Internet.

### General Plan:

1. DNA sequencing technologies
2. Sequencing complete genomes
3. Sequencing metagenomes
4. Biological sequences databases
5. Biological meaning of sequence alignment
6. Aligning nucleotide sequences
7. Local similarity search of nucleotide sequences
8. Local similarity search of protein sequences
9. Functional analysis of protein sequences
10. Analysis and discussion of case studies

This course can have recognition of 6 ECTS for FCUL PhD students enrolling in it as part of their first doctoral year. For FCUL PhD students only requiring 5 ECTS recognized in their specific PhD programs the last 6 hours of the course are not mandatory and the certificate will be on 'Topics in bioinformatics analysis of biological sequences'.

**Location:** Faculdade de Ciências da Universidade de Lisboa

**Nº (min, max) students:** 10 – 20

**Directed to:** PhD or MSc students, postdocs, clinical analysts and other professionals working in Biology, Biochemistry and related topics.

**Minimal formation of students:** bachelor degree in Biology, Biochemistry or related areas.

**Fee:** free for 1st year PhD students in the Doctoral program in Biology (FCUL), Biodiversity, Genetics and Evolution (BIODIV UL; UP) and Biology and Ecology of Global Changes (BEAG UL, UA) when the course counts credits for their formation, in which case the delivery of a final report done after the course is mandatory; 50 € for more advanced PhD students of cE3c; 80 € for PhD students of the PEERS network (CFE); 125 € for FCUL Master students and unemployed; 180 € for BTI, BI and other PhD students; 250 € for Professional and postdocs.

When the maximum number of students is reached 10 vacancies will be available for non-paying 1st year PhD students mentioned above, being, by order of preference: 1) cE3c students; 2) BIODIV students (not from cE3c); 3) FCUL students (not from cE3c); 4) BEAG students (not from FCUL).

**Deadline for applications:** January 24<sup>th</sup>, 2020

To apply send an e-mail to Teresa Nogueira ([teresainogueira@gmail.com](mailto:teresainogueira@gmail.com)) with a cv and motivation letter. The cv and letter should be named as *1st-lastNAME-CV.pdf* and *1st-lastNAME-ML.pdf* (that is personalize the name of each file with your first and last name).

**In the email please add the following information:**

Full Name:

E-mail:

Phone:

Professional activity: Professional/Postdoc, BTI, BI (or other non-post-doc research grant), PhD student (with/ without scholarship), Lic. (Bachelor)/Master student

Academic formation:

PhD student of the 1st year of Doctoral programme BIODIV (FCUL/FCUP), Biologia (FCUL) or BEAG (FCUL or UA)?:

If yes to the above question, PhD student doing the Course to count credits for 1st year?:

PhD student of cE3c or CEF (Centro de Ecologia Funcional):?

If PhD student from another programme/centre, which:

