



**CE3C**  
centre for ecology, evolution  
and environmental changes



**Ciências  
ULisboa**  
Faculdade  
de Ciências  
da Universidade  
de Lisboa



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## Hands-on Molecular Tools – Beginners Crash Course

**Lecturers/Organizers:** Ana Catarina Certal (Champalimaud Foundation-CF) Ana Raquel Tomás (CF), Cátia Feliciano (CF), Diogo Fernandes (CE3C-CHANGE/FCUL), Marta Barbosa (CF), Rita Zilhão (CE3C-CHANGE/FCUL), Vasco Barreto (FCT-UNL/ESSEM)

**Date:** September 5<sup>th</sup> – 9<sup>th</sup>, 2024

**Duration:** 36 hours (contact hours)

**Schedule:** 10 am – 7.00 pm (5 days)

**Objectives:** This hands-on course, limited to a small number of participants, aims at those who are looking for basic molecular biology training and wish to get familiar with some of the potentialities of this technology.

The specific objectives are: This course will incorporate theoretical and practical classes, where the participants will acquire experience in RNA extraction, cDNA synthesis, PCR, restriction enzyme digestion, electrophoresis, and plasmid DNA isolation, as well as sequence analysis and experimental design of a cloning project.

## **PROGRAM**

### September 5<sup>th</sup>

10.00 – 11.00 Introductory notes. Project design  
11.00 – 11.30 Coffee break  
11.30 – 13.00 Principles of Molecular Biology I  
13.00 – 14.00 Lunch  
14.00 – 15.00 Biosafety in a Molecular Biology lab  
15.00 – 19.30 RNA extraction

### September 6<sup>th</sup>

10.00 – 11.00 Principles of Molecular Biology II  
11.00 – 11.30 Coffee break  
11.30 – 13.00 Primer design  
13.00 – 14.00 Lunch  
14.00 – 15.30 cDNA prep  
15.30 – 17.30 PCR, Gel preparation  
17.30 – 19.00. Run gel. Cut band (freeze)

20.00 - .... Welcoming dinner

### September 7<sup>th</sup>

10.00 – 11.00 Updating/Troubleshooting  
11.00 – 11.30 Coffee break  
11.30 – 12.30 Gel extraction. Digest PCR  
12.30 – 13.30 Lunch  
13.30 – 14.30 PCR clean. Measure DNA. Ligation  
14.30 – 15.30 Restriction analysis  
15.30 – 17.00 Transformation I. Pick colonies  
17.00 – 18.00. Pizza break  
18.00 – 19.00 Transformation II

### September 8<sup>th</sup>

10.00 – 13.30 Minipreps. Set digestion. Gel preparation.  
13.30 – 14.30 Lunch  
14.30 – 15.30 Advanced cloning I (other approaches).  
15.30 – 16.00 Coffee break  
16.00 – 17.30 Run gel. Photo gel  
17.30 – 19.00 Sequence analysis troubleshooting

September 9<sup>th</sup>

10.00 – 11.00 CRISPR

11.00 – 11.30 Coffee break

11.30 – 13.00 Advanced cloning II (viral vectors). Project results and wrap-up

Participants have to be present at 85% of the contact hours (this means that they can miss one half-day), and actively participate in all activities.

This course can give credits to PhD programs at FCUL or programs with partnerships from FCUL and other institutions with 6h-7h of contact hours per ECT, as a function of specific requirements. **For these students, in addition to the exercises done during the week, the delivery of a written report done after the course is mandatory.** For programs with fewer hours of contact per ECT (6h/ECT, getting 6 ECTs from the course) students need to do an additional assignment (summary report). If needed 1 or 2 additional hours of contact may be added. Such report(s) are also advised for other students requesting accreditation of the course in their institutions.

**Nº (min, max) students:** 10 – 16

**Minimal formation of students** Graduation (bachelor degree)

**Directed to:** Master and PhD students, lab technicians, post-docs and medical doctors

**Location:** Faculty of Sciences of the University of Lisbon (FCUL)

#### **FEE**

Free for 1st year PhD students in Doctoral programmes at FCUL (e.g. Biologia), Biodiversity, Genetics and Evolution (BIODIV UL; UP), Biology and Ecology of Global Changes (BEAG UL, UA) and Sustainability Science (UL, several institutions), when the course counts credits for their formation, in which case the delivery of a final report done after the course is mandatory; the course is also free for more advanced PhD students of the BIODIV programme (ULisboa or UPorto) – Only two students in one of these circumstances will be accepted. 400€ for all other academic/professional situations.

**Deadline for applications:** July 5<sup>th</sup>, 2024

#### **How to apply**

To apply fill in the formulary at the link:

<https://docs.google.com/forms/d/e/1FAIpQLScLSCs46a05bncthSbnHnHk5UCn36kADL1CzZoYBJ1iEY80DQ/viewform>

This formulary is strictly confidential. All the mandatory fields are required because this CE3C Advanced Course is also offered as part of the PRR program of FCUL.

For any questions pertaining the course schedule/programme, registration procedure, payment, receipts and certificates of attendance please check <https://ce3c.ciencias.ulisboa.pt/training/ver.php?id=271> or contact [mtp@research.fchampilimaud.org](mailto:mtp@research.fchampilimaud.org)

For any questions referring to course credits within the PRR program of FCUL please contact the CE3C coordinator of the “CE3C Advanced Courses” Margarida Matos ([mmmatos@fc.ul.pt](mailto:mmmatos@fc.ul.pt)) and Rita Zilhão ([rmzilhao@ciencias.ulisboa.pt](mailto:rmzilhao@ciencias.ulisboa.pt)) from the organizing committee.