



UNTIL DEATH DO US APART: LIVING IN A SYMBIOTIC WORLD

Teachers: Silvana Munzi (Univ. Lisboa), Cristina Cruz (Univ. Lisboa), Lourdes Morillas (Univ. Lisboa).

NOTE: this course can be done only with theoretical classes (option 1, 20h, online) or with both practical and theoretical classes (option 2, 36h, practical presential in mornings, theoretical afternoons online, as option 1)

Calendar: February 3rd-7th 2025

Schedule: 14:00-18:30 (20h of contact) (option 1); 9:30-18:30 (36h of contact) (option 2)

Option 1 – Participants can decide to attend only theoretical lessons

Location of theoretical lessons (evenings): online

Option 2 - Participants can decide to attend theoretical and practical lessons

Location of practical lessons (mornings): Faculdade de Ciências da Universidade de Lisboa

Location of theoretical lessons (evenings): online

Objectives: Symbiosis is a key strategy for life on Earth. Nevertheless, although many research groups have long been committed to the study of symbiosis, its definition and functioning are not fully understood, and its ecological role and relevance are still underestimated.

Symbiotic associations vary from parasitism to mutualism and even simple persistent biological interactions, making the knowledge fragmented and focused on the details of single symbiotic systems. Knowledge of the various symbiotic relationships is rapidly increasing with the development of -omics tools, but without efforts to find common grounds. The concept itself of symbiosis can be faced by different points of view, spanning from biology to evolution, from philosophy to artificial intelligence.

In this course, we promote a multidisciplinary approach presenting the most recent findings on the topic and challenging the traditional way of considering symbiotic associations as exceptions and not as the rule.

General plan: Starting from the definition of symbiosis, we'll analyze the role of symbioses in evolutionary terms.

Plant-fungal-bacteria symbioses will be presented to illustrate ecological networks and ecosystem services. Examples of different symbiotic associations (lichens, biofilm, mycorrhizas) will be given by specialists in the field in theoretical-practical lessons taking in consideration morphological, physiological and ecological aspects. Part of the course will be devoted to the human microbiome and insect-bacteria symbioses and their consequences on/potentialities for human and environmental health. Philosophical aspects and challenges brought by the new discoveries in the area will be discussed. Potential applications in technology like evolutionary algorithms and industrial symbiosis will be considered as well as sociological aspects associated to agroecology. Practical lessons will allow participants to "put their hands" in some of the symbiotic systems presented in the course.

Participants have to be present at 85% of the contact hours, and actively participate in all activities.

This course can give credits to PhD programmes at FCUL or of programmes with partnership from FCUL and other institutions with 6h-7h of contact hours per ECT, as a function of specific requirements. For these students additionally to the exercises done during the week the delivery of a written report done after the course is mandatory. The exact exercise for students doing option 1 and 2 will be explained during the course. For option 2, for programmes with less hours of contact per ECT (6h/ECT), getting 6 ECTs from the course, students need to do an additional assignment (summary report). Such report(s) are also advised for other students requesting creditation of the course in their institutions.

Nº (min, max) students: 10 – 20

Minimum formation: Bachelor ("Licenciatura") in Biology, Natural Science or related areas

Directed to: PhD or MSc students in Biology, Microbiology, Ecology, Environmental Studies or related areas, and postdocs and other professionals working in related topics

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 final report(s) done after the course is mandatory; the course is also free for more advanced PhD students of the BIODIV programme (ULisboa or UPorto); for other students fees vary whether option 1 or option 2 is chosen:

For other students:

FEE (option 1): 15 € for other PhD students from cE3c of other programmes besides BIODIV (free), 30 € for PhD students from institutions of the PEERS network (CFE); 55 € for FCUL Master students, more advanced PhD FCUL students and unemployed; 80 € for BTI, BI and other PhD students; 115 € for Professional and postdocs.

FEE (option 2): 50 € for more advanced PhD students of cE3c of other programmes besides BIODIV (free); 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 students from: 1) cE3c; 2) BIODIV (not from cE3c); 3) FCUL (not from cE3c); 4) Sustainability Science (not from cE3c or FCUL); 5) BEAG (not from cE3c or FCUL).

Deadline for applications: January 10th, 2025

Candidates should send an e-mail to Silvana Munzi (ssmunzi@fc.ul.pt) with a short 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:

OPTION CHOSEN (1 or 2):

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

PhD student of the 1st year of a Doctoral programme at FCUL, BIODIV (FCUL/FCUP), 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)?:

Name of the PhD programme: