



SOIL ECO

## Soil ecology and ecosystem services

**Lecturers:** Teresa Dias and Cristina Cruz (cE3c)

**Note:** This course is online

**Calendar:** January 23<sup>rd</sup> – 27<sup>th</sup> 2023

**Duration:** 36 hours

**Schedule:** 9h-13h and 14h00-17h00 Monday to Thursday; 9h-13h and 14h00-18h00 Friday

**Objectives:** The course SoilEco aims at introducing attendants to an updated state of the art of diversity of the soil biota and the functional roles played by soil organisms in key ecological processes. SoilEco will have the participation of some of the most relevant specialists in the field and will enable an ‘assisted project development’ approach to the study of soil biology and ecology. The course will include both theoretical classes and an assisted project development.

Lack of fertile land to feed the exponentially growing population, insufficient water availability and quality, changes in the flow of nutrients through the bio-geo-cycles (especially N and P) and climate and land use changes are impacting ecosystems and their capacity to deliver goods and services for humans. It is striking that all these issues interact around one common resource - **SOIL** and its biodiversity. While scientists have long recognized soils as living and of central importance to food production, there is now wide appreciation that they are a foundation for human and ecosystem sustainability. The ecosystem services that flow from soils and their biodiversity include soil formation and renewal of its fertility, maintenance of the composition of the atmosphere through carbon storage and greenhouse gas flux, erosion prevention, the regulation of diseases, the decontamination and bio-remediation of toxic chemicals and habitat and food for a variety of wildlife. Additionally, living soil is a global receptacle of genetic diversity that is yet to be fully explored by humans. Despite this, soils are being degraded at high rates. Policy makers are seeking multiple solutions and need reliable scientific information on soils, their biodiversity and the many services they provide, as well as their resilience under the interacting environmental challenges. Thus, the need for improvement basic skills and their utilization on soils is a true challenge throughout Europe.

The advanced course on Soil ecology and ecosystem services (SoilEco) is conceived to give an integrated view of the living component of soils, and its key role on ecosystem functions and processes. Therefore, the course

will assess the link between soil biological diversity and ecosystem functions. Relying on different specialists on soil the course is made up of two interrelated strands of work: theoretical classes and assisted project development, tuned according to the attendants interests, aiming at the possibility to deepen their own basic problem on soil ecosystem services.

**General Plan:**

Online classes with the participation of specialists (national and international) on the following subjects:

- (i) The intimate relation between soil ecology and ecosystem services.
- (ii) Key genes and key functions in soil, sequence and consequence.
- (iii) Symbioses - the key for soil biotic assemblages and soil quality.
- (iv) Microbiological methods to assess soil quality.
- (v) Soil threats and bioindicators of soil quality and services.
- (vi) Soil quality, policies and stakeholders.

Each subject will have a coordinator, who will be responsible for the preparation of a background document tailored according to the attendants profile. Soil Eco will count with the participation of facilitators to promote and integrate the subjects under discussion.

The assisted project development will be focused on the use of bioindicators of soil quality linked to ecosystem services. Attendants will be organized in groups, will identify a question and will, together with the assistance of the course coordinators, develop a project proposal on soil ecology and ecosystem services, which will then be presented and discussed at the end of the course.

<b>Day</b>	<b>Morning</b>	<b>Afternoon</b>
<b>Monday</b>	1. The intimate relation between soil ecology and ecosystem services Soil definition, and biodiversity.	Assisted project development (by each group of participants).
<b>Tuesday</b>	2. Key genes and key functions in soil, sequence and consequence. 3. Symbioses - the key for soil biotic assemblages and soil quality.	Assisted project development (by each group of participants).
<b>Wednesday</b>	4. Microbiological methods to assess soil quality.	Assisted project development (by each group of participants).
<b>Thursday</b>	5. Soil threats and bioindicators of soil quality and ecosystem services.	Assisted project development (by each group of participants).
<b>Friday</b>	6. Soil quality, policies and stakeholders.	Projects presentation (by each group of participants) and discussion.

**This course can have a recognition of 6 ECTs for FCUL PhD students enrolling in it as part of their first doctoral year. These students need to deliver two reports after the course. For students only requiring 5 ECTs recognized in their specific PhD programmes the last 3.5 hours of the course are not mandatory, they need to deliver only the main report and the certificate will be on 'Topics in Soil ecology and ecosystem services'. Such report(s) are also advised for other students requesting creditation of the course in their institutions.**

**Location:** This is an online course

**Nº (min, max) students:** 8-20

**Minimum formation:** Bachelor's degree in biology or related areas.

**Directed to:** The course is targeted for post-graduates studying or working directly on (soil) ecology, or simply interested in increasing their knowledge on this topic.

Fees: 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); 30 € for more advanced PhD students of cE3c of other programmes; 40 € for PhD students of the PEERS network (CFE); 105 € for FCUL Master students and unemployed; 160 € for BTI, BI and other PhD students; 230 € 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: December 28<sup>th</sup> 2022

Candidates should send a short CV and a motivation letter (including the problem to be solved) to Teresa Dias at the following email address: [mtdias@fc.ul.pt](mailto:mtdias@fc.ul.pt). 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

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: