

Soil Ecology (C004531)

Course size *(nominal values; actual values may depend on programme)*

Credits 4.0 **Study time 120 h**

Course offerings in academic year 2025-2026

A (semester 2) English Gent

Lecturers in academic year 2025-2026

Verleyen, Elie	WE11	lecturer-in-charge
Bonte, Dries	WE11	co-lecturer
Verbeken, Annemieke	WE11	co-lecturer
Willems, Anne	WE10	co-lecturer

Offered in the following programmes in 2025-2026

	crdts	offering
Master of Science in Biology	4	A
Exchange Programme in Biology (master's level)	4	A

Teaching languages

English

Keywords

Soil biota, soil food webs, climate change, soil ecosystem functions, greenhouse gas fluxes, nutrient cycling

Position of the course

Soils remain one of the final frontiers in biodiversity research. From the cold, dry and nearly permanent frozen soils in the Antarctic to the warm and wet soils in tropical rainforests, soils harbor bacteria, fungi, heterotrophic and photoautotrophic protists, fauna and flora, which all interact in ways that allow ecosystems to function and to provide ecosystem services. Given the dramatic rate of change in climatic conditions and land-use, it remains unclear how soil biological communities will adapt and/or evolve to novel combinations of climate, vegetation, and soil conditions. This course will provide a general overview of soils as a habitat and the main autotrophic and heterotrophic biota living in them. This information will be used to evaluate the interactions and response of these biological communities to climate and environmental changes, and how these will affect ecosystem functions such as carbon and nutrient cycling and greenhouse gas fluxes.

Contents

- I. The soil habitat
- II. Photo-autotrophic primary production: Plants, Cyanobacteria and algae
- III. Bacteria and Archaea
- IV. Fungi
- V. Heterotrophic protists
- VI. Viruses
- VII. Soil fauna
- VIII. The rhizosphere and mycorrhizal symbiosis
- IX. Soil food webs and ecological interactions
- X. Soil ecosystem functions and the C-cycle
- XI. Nutrient cycling and greenhouse gas fluxes in soils

Initial competences

Bachelor in biology (community and systems ecology, microbiology, mycology,

biochemistry)

Final competences

- 1 Knowledge on the biodiversity of soil biota from all domains of life, and state-of-the-art methods for studying them.
- 2 Understanding the interactions between soil biota and their environment, and key-processes affecting soil biological communities.
- 3 Knowledge on soil ecosystem functions and the main biota and biological processes supporting them.
- 4 Being able to evaluate the effects of climate and environmental changes on soil ecosystems and their functions.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Group work, Lecture, Independent work

Extra information on the teaching methods

Theory is provided during lectures using presentations that are made available electronically. In addition, in a microteaching assignment, students develop a topic - individually or in small groups - related to nutrient cycling and greenhouse gas fluxes in soils. The students present this information to fellow students and teachers during a presentation, followed by a question and answer session.

Study material

Type: Slides

Name: Slides of the lectures, scientific publications

Indicative price: Free or paid by faculty

Optional: no

Language : English

Oldest Usable Edition : new course

Available on Ufora : Yes

Available in the Library : No

Available through Student Association : No

References

Course content-related study coaching

Questions and problems can be addressed individually via e-mail, on appointment, or during the lectures and exercises. As a master class, students are expected to organize themselves in teams to reach the study goals of the independent group work efficiently.

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment with open-ended questions

Examination methods in case of periodic assessment during the second examination period

Written assessment with open-ended questions

Examination methods in case of permanent assessment

Participation, Assignment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

Theory: written examen.

Non-periodic evaluation: evaluation is based on the presentation (microteaching) of a topic that was prepared in group, and on personal participation in the subsequent discussion in class (posing and answering questions).

Calculation of the examination mark

Periodical evaluation: 80%.

Non-periodical evaluation: 20%. The latter is the evaluation of the microteaching assignment.

In the second exam period, the same marks for the non-periodical evaluation are again taken into account for 20% of the total exam score.