

Soil Biogeochemistry of Agricultural and Forest Ecosystems (I002926)

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

Credits 6.0

Study time 180 h

Course offerings in academic year 2023-2024

A (semester 1)

English

Gent

Lecturers in academic year 2023-2024

Freudiger, Martin

GOTTIN01 lecturer-in-charge

Offered in the following programmes in 2023-2024

[International Master of Science in Soils and Global Change \(main subject Soil Biogeochemistry and Global Change\)](#)

crdts

6

offering

A

Teaching languages

English

Keywords

Position of the course

Contents

In the framework of this module, biogeochemical processes of C, N, P, S and Fe cycle in agro- and forest ecosystems shall be demonstrated and their microbial and molecular basics will be unraveled. It will be shown how land use, forest and agricultural management practices (crop sequences, tillage, fertilization, etc.) will impact the element cycles. Analytical biogeochemical methods to assess these effects on element fluxes and cycles will be explained in detail. Isotope-based examples and experiments to assess formation and turnover of soil organic matters as will be explained.

The module consists of a lecture (3 SWS) and a seminar (1 SWS) in which a methodological focus will be set where one study of interest will be presented by the students, and training study will be implemented

Initial competences

Basics in soil science, biology, physics and chemistry

Final competences

- 1 Understanding underlying process of C, N, P, S and Fe cycle in agroecosystems
- 2 Understanding the impact of agricultural management on these element cycles
- 3 Quantification of C-, N- and P-fluxes via isotope based methods (labeling experiments such as pulse labeling, FACE experiments, C-3 and C-4 vegetation changes, autoradiography)
- 4 Formation of soil organic matter from plant and microbial residues:
Disentangling and characterizing the composition of SOM
- 5 Theoretical basics shall be thought and their application shall be demonstrated at distinct examples from literature. After this course, students will be able to understand complex biogeochemical studies published and evaluate potentials and pitfalls of applied methods.

Conditions for credit contract

This course unit cannot be taken via a credit contract

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture

Learning materials and price**References****Course content-related study coaching****Assessment moments****Examination methods in case of periodic assessment during the first examination period**

Oral assessment, Assignment

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

Oral assessment, Assignment

Examination methods in case of permanent assessment**Possibilities of retake in case of permanent assessment**

examination during the second examination period is possible

Extra information on the examination methods

Oral exam of 20 minutes (75% of the overall grade) and evaluation of the 15 min presentation (25% of overall grade)

Understanding of biogeochemical cycles in agroecosystems and their drivers as well as the impact of agricultural management on them. Ability to choose, evaluate and discuss about various biogeochemical, molecular and microbiological methods to study element cycles and their drivers in soils.

Calculation of the examination mark