

Isotopes in Ecosystem Sciences (e-learning course) (I002899)

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

Credits 6.0

Study time 180 h

Contact hrs

60.0h

Course offerings in academic year 2022-2023

A (semester 1)

English

Gent

Lecturers in academic year 2022-2023

Dippold, Michaela

GOTTIN01 lecturer-in-charge

Banfield, Callum Colin

GOTTIN01 co-lecturer

Dorodnikov, Maxim

GOTTIN01 co-lecturer

Dyckmans, Jens

GOTTIN01 co-lecturer

Offered in the following programmes in 2022-2023

crdts

offering

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

6

A

Teaching languages

English

Keywords

Position of the course

Contents

- Introduction, stable and radioactive isotopes
- Labeling and natural abundance, Tracer approaches
- Quantifying of stable and radioactive isotopes (Isotope ratio mass spectrometry, gas lasers, scintillation counting, autoradiography and phosphorimaging, gamma-detectors, accelerated mass spectrometers, etc.
- Applications of isotopes in soil – plant – ecosystem studies
- C, N and P input by plants into the soil ^{14}C , ^{13}C , ^{15}N , ^{33}P
- C turnover and soil organic matter studies ^{14}C , ^{13}C
- Nutrient cycles in soils ^{15}N , ^{33}P , ^{32}P
- Visualization of belowground processes ^{14}C , ^{33}P , ^{32}P
- Isotope dilution method ^{15}N
- Bomb- ^{14}C : a global labeling approach ^{14}C
- Use of isotopes for erosion quantification ^{137}Cs
- Coupling of isotopes with molecular biology and biomarkers
- Metabolic tracing based on position- and dual isotope labeling approaches

Initial competences

Basic soil science and chemistry knowledge

Final competences

The course is aimed to deepen the competence in the use of isotopes to study ecosystem processes. It aims at familiarizing the participants with a broad set of isotope applications, from fractionation based natural abundance approaches up to tracer applications. Advantages and disadvantages of stable and radionuclides will be discussed and the set of instrumentation required for their measurement shall be understood.

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**

Written examination

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

Written examination

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

examination during the second examination period is possible

Calculation of the examination mark