



**Introduction to Soil Science:
Theory, Concept and
Applications**

**October
14-18th
2024**

Ecology Modelling Remediation

Processes Stoichiometry Hydrology

Pedometrics Soil physics

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PhD course, 3 ECTS

Date and location:

14 – 18th October 2024,

Five-day meeting at campus Ultuna

Background

Soil is one of the most diverse habitat in terrestrial ecosystems and possesses one of the most diverse assemblage of living organisms. The complexity of the soil matrix, both chemically and physically has historically made the soil biology, chemistry and physics disciplines to evolve separately. Yet, there is increasing awareness of the importance of adopting a systemic approach that take into consideration the interactions between those disciplines to further our understanding of soil system processes through space and time.

Course objectives

The aim of this course is to (i) provide background knowledge and their research application in the main disciplines of soil science, (ii) to discuss the current soil threats and their possible mitigation (iii) to identify synergies between different disciplines to describe and understand phenomena occurring in soils.

The course consists of five-day meetings at SLU campus Ultuna from Monday to Friday November 2024. We plan to have two lab visits at the department of ecology and at the department of soil and environment.

Topics covered and activities

The 5-day meetings will cover the following topics:

Soil biology

- Soil biodiversity and their importance for ecosystem functioning
- Linkage between soil biota, stoichiometry and soil processes
- Root traits and microbial-plant-soil interactions

Soil physics

- Soil structure, porosity and bulk density
- Soil management and mechanics

Soil chemistry

- Processes, cation exchange capacity, buffering capacity, redox properties
- Soil organic matter and fertility
- Mobility of nutrients and contaminants, remediation
- The fate of engineered nanoparticles, nanoplastics and colloid-associated metals in soils

Soil Hydrology

- Water infiltration, preferential flow
- Water management in agricultural soils

Other topics

- Soil modelling
- Pedometrics & soil mapping
- Soil health, global change, ecosystem services, UN sustainable goals and planet boundaries

Examination

Marking scale: Pass/Fail

The course consists of five-day meetings at SLU campus Ultuna from Monday 14th to Friday 18th October 2024. Prior to the meeting the students will need to prepare a 5 min PowerPoint presentation, to introduce the subject and goals of their PhDs during the meeting. After the five-day meeting, the PhD student will write a 1-2 page essay to reflect on the different concepts learned during this course, and to reflect on which concepts and application seen during the course will be important for the student PhD research.

Prerequisite

This course is intended for any PhD students curious about soils and which to acquire solid knowledge in soil sciences.

Contact information

Please do not hesitate to contact Dr Nadia Maaroufi if you have any questions regarding the course. When applying please give your name, personal number, PhD title, lab group name.

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Deadline for applications: **7th of October 2024**