GHENT UNIVERSITY

Course Specifications

From the academic year 2021-2022 up to and including the academic year

Soil Prospection (I002501)

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

Credits 4.0 **Study time 120 h** **Contact hrs** 40.0h

Course offerings and teaching methods in academic year 2022-2023

A (semester 2)	English	Gent	fieldwork	5.0h
			lecture	30.0h
			seminar: coached exercises	5.0h

Lecturers in academic year 2022-2023

Dondeyne, Stefaan	WE12	lecturer-in-charge

Offered in the following programmes in 2022-2023	**crdts**	**offering**
International Master of Science in Soils and Global Change (main subject Physical Land Resources and Global Change)	4	A
Exchange Programme in Bioscience Engineering: Agricultural Sciences (master's level)	4	A
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)	4	A
Exchange Programme in Bioscience Engineering: Land and Forest management (master's level)	4	A

Teaching languages

English

Keywords

Soil survey, soil profile description, adequacy of soil databases, updating and upgrading, soil classification, FAO, (WRB, USDA soil taxonomy)

Position of the course

- Inform students about the standard procedures for recording soil sites and profiles and the limited information provided by these databases
- Train on how to come to more adequate and comprehensive databases (currency and completeness)
- Inform about the evolution of soil classification in the last 150 years, the present day situation and how it comes that different experts give different names to the same soil
- Introduction to basic diagnostic horizons and taxa of the international classification systems
- Introduction to procedures to update and to upgrade soil databases, including soil mapping.
- Introduction to modern non-invasive sensor-based observational techniques for soil data collection.

Contents

Theory

1. Primary data collection

1.1. Point scale data collection (FAO-guidelines, extended field base, data requirements)

1.2. Soil survey and mapping (concepts, organization, reporting, types of map legends, USDA-approach, soil survey of Belgium; case study)

1.3. Quality of soil maps

2. Secondary data collection

2.1. Updating soil information systems and monitoring (interaction with stakeholders, sampling; case study)

2.2. Upgrading of soil information systems (interaction with stakeholders, sampling; case study)
3.Soil classification
3.1. Introduction (from soil data to diagnostic horizons, properties and materials; application of classification keys; data rich and data poor situations)
3.2. WRB classification system
3.3. USDA Soil taxonomy classification system
Indoor exercises, training in:
- Making, reading and interpreting soil site and profile descriptions
- Consulting topographic maps
- Evaluation of soil map quality
- Updating of soil maps
- Upgrading of soil information systems
- Classifying soil profiles after determination of diagnostic horizons and properties
Field training sessions on :
- Comprehensive and adequate recording of soil site and profile characteristics (according to the FAO guidelines)
- Field soil recording based on transects (top-, hydro-, lithosequences)
- Field detection of potential diagnostic horizons
- Tentative soil classification

Initial competences

Soil Prospection and Classification builds on certain learning outcomes of course unit Pedology ; or the learning outcomes have been achieved differently. Students should be able to consult topographic and thematic maps and to have a basic understanding of Geographical Information Systems.

Final competences

1 The student can describe field soils using the FAO-guidelines
2 The student can classify soils with the World Reference Base system using soil profile descriptions and analytical data
3 The student can plan and conduct primary and secondary soil data collection

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

Lecture, Fieldwork, Seminar: coached exercises

Extra information on the teaching methods

During the plenary lectures, exercises are introduced; these must be done individually and are usually discussed the same lecture or at the beginning of the next lecture. Students are asked to present their results and will be evaluated based on the presentation. In the easter period, a field practical is organised, during which students can practice their knowledge and skills.
Depending on the COVID19-status, an alternative for the excursion may be organized.

Learning materials and price

1. Finke, P.A., 2015. Soil prospection and classification (with exercises). Syllabus Vakgroep Geologie en Bodemkunde. 96 pp
2. IUSS Working Group WRB. 2015 World Reference Base for soil resources.
3. FAO, 2006. Guidelines for soil description. 4th edition. FAO, Rome
4. Powerpoints
5. Excursion guide
The powerpoints as well as some relevant articles are available the day of the lecture on Ufora. Estimated cost: 20 EUR

References

Legros, J-P., 2006. Mapping of the Soil. Science publishers, Enfield, NH, USA
Soil Survey Staff. 2010. Keys to Soil Taxonomy. United States Department of Agriculture. Natural Resources Conservation Service. Eleventh Edition, 2010

Course content-related study coaching

Interactive support via Ufora, by e-mail or in person. Assistants collaborate for the field training and exercises.

Assessment moments

end-of-term and continuous assessment

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

Written examination with open questions

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

Written examination with open questions

Examination methods in case of permanent assessment

Report, Oral examination, Job performance assessment, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

Students are asked to present their results of the individual exercises made in class and will be evaluated based on the presentation. Period—related evaluation is a written exam with open questions.

Calculation of the examination mark

60% of the final score is determined by the evaluation of the theoretical exam;
30% is determined by the evaluation of the (individual) excursion (field practical) report;
10% of the final score is determined by an evaluation of the presented results for the exercises.

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.