GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2020-2021

Soil Degradation (I002712)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

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

Credits 5.0 Study time 150 h Contact hrs 50.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 2)	English	Gent	seminar: practical PC room classes	11.25 h
			lecture	22.5 h
			seminar: coached exercises	3.75 h
			practicum	3.75 h
			fieldwork	3.75 h

Lecturers in academic year 2020-2021

Verdoodt, Ann	LA20	lecturer-in-charge

Offered in the following programmes in 2020-2021	crdts	offering
Master of Science in Physical Land Resources (main subject Land Resources Engineering)	5	A
International Master of Science in Soils and Global Change (main subject Physical Land Resources and Global Change)	5	A
Master of Science in Physical Land Resources (main subject Soil Science)	5	A
Master of Science in Bioscience Engineering: Land and Water Management	5	A
Exchange Programme in Bioscience Engineering: Land and Forest management (master's level)	5	A

Teaching languages

English

Keywords

Soil structural degradation, soil compaction, salinization, decline in OM, aridity, drought, desertification, soil conservation, economics of soil degradation

Position of the course

This course aims to provide students specialized insights into different types, causes and processes of soil degradation and desertification. The students learn to apply this knowledge to assess soil degradation status and risk at different spatial scales, and to formulate soil protection and conservation strategies.

Contents

Theory
A first chapter is devoted to describing the definition, importance, general causes and consequences of different types of land degradation. In the following chapters, each land degradation type (structural soil degradation, soil compaction, decline in soil organic matter, salinization and alkalinisation, and soil erosion (briefly)) is discussed in detail, with attention paid to the specific soil degradation processes, underlying causes, options to avoid and correct soil degradation, and ways to asses and interpret the status and risk for that land degradation type. Attention is also paid to desertification and drought risk assessments. Furthermore, different (interdisciplinary) frameworks and tools to assess soil degradation (DPSIR, Livelihoods framework) are discussed and some major soil protection strategies are highlighted. An introduction is given to the economics of land degradation.

Practicals

The practicals comprise field work and laboratory skills related to the assessment of different types of soil degradation, coached exercises and a GIS task for the identification of soil degradation risk areas, as well as a task on economics of soil degradation. The outcomes of the tasks need to be compiled and discussed in group reports, submitted at regular time steps. A class discussion will be organised to integrate the outcomes of the soil degradation case studies studied in the various practicals.

Initial competences

The student:

- has insight in the composition of soils, can explain the behaviour of soils on the basis of their physico-chemical properties, and understands classification of soils on a basic level. The student can thus read and interpret soil reports, tables with soil analytical data and soil maps.
- has basic knowledge of meteorological processes.
- can perform spatial analyses using GIS software on digital maps representing vector and raster data structures

Final competences

1 Correctly use the specific terminology related to soil degradation and desertification
2 Have insights in the processes, potential causes, and impacts of the main threats by soil degradation
3 Identify relevant indicators and their related analytical procedures to assess soil degradation status
4 Correctly interpret analytical data with respect to soil degradation or soil conservation
5 Integrate knowledge on soil degradation and land information systems to delineate soil degradation risk zones
6 Identify relevant and sustainable soil protection and conservation measures
7 Be aware of the economics of soil degradation
8 Report soil degradation research methods and results clearly, unambiguously, soundly
9 Display integrative thinking on soil degradation and land management
10 Collaborate with fellow students in a (interdisciplinary) team to solve soil degradation assignments

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, practicum, fieldwork, seminar: coached exercises, seminar: practical PC room classes

Learning materials and price

An English syllabus will be made available during the first lectures, downloadable from Minerva. There are no obligatory handbooks. During the course of the lectures, an electronic version of the slides will be deposited at the Minerva site.
An estimated cost of 20.0 EUR is foreseen to cover expenses related to the excursion/field work (guide, transport).

References

- FAO 2015. Status of the World’s Soil Resources, FAO.
- GLASOD (Global Assessment of Soil Degradation) publications (ISRIC, Wageningen): http://www.isric.org/projects/global-assessment-human-induced-soil-degradation-glasod
- (G)LADA (Land Degradation Assessment in Drylands) publications, FAO & ISRIC: http://www.isric.org/projects/land-degradation-assessment-drylands-glada
- Liniger, H.P., R. Mekdaschi Studer, C. Hauert and M. Gurtner. 2011. Sustainable Land Management in Practice – Guidelines and Best Practices for Sub-Saharan Africa. TerrAfrica, World Overview of Conservation Approaches and Technologies (WOCAT) and Food and Agriculture Organization of the United Nations (FAO)
- Liniger, H.P. and W. Critchly. 2011. WOCAT 2007: where the land is greener. Case studies and analysis of soil and water conservation initiatives worldwide. CTA, FAO, UNEP, CDE.
- Louwagie, G., Gay, S.H., Burrell, A. 2009. Addressing land degradation in EU agriculture: relevant processes, practices and policies. Report on the project “Sustainable agriculture and Soil Conservation (SoCo). EUR 23767 EN. JRC, IPTS, IES.

Course content-related study coaching

Personal coaching before and after the lectures. Consultancy and feedback about the corrected applications by assistant during the guided exercises.

Evaluation methods

end-of-term evaluation

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

Written examination with open questions

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

Written examination with open questions

Examination methods in case of permanent evaluation

Participation, assignment, skills test

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

The period-aligned written examination will assess the knowledge and insight of the student in different soil degradation processes, indicators and frameworks for their assessment, and their control.

With respect to the practical skills and interpretation, the students will be evaluated based on their participation throughout the semester and the group reports following the various practicals (assignment and/or skills test).
Deadlines for submission of the group reports need to be strictly respected. Each student is held responsible for the timely submission of the reports. Each group member is expected to contribute to all practicals and group reports.

Calculation of the examination mark

- Theory: 65% (written exam)
- Skills and exercises: 35% (25% on group reports, and 10% on participation)

If there is an obvious difference in input and commitment between the different group members, the marks for the group reports might differ among the students belonging to the same group.

Unfoundedly eschewing the non-period aligned evaluation for this course unit leads to a total mark (theory+exercises) of maximum 9/20, regardless of the marks for the theoretical part. In case of foundedly eschewing the practicals or field work, (an) alternative task(s) will be provided.