GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Soil Degradation (I002712)

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

Credits 5.0 **Study time 150 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 2)	English	Gent	group work lecture seminar independent work

Lecturers in academic year 2024-2025

Verdoodt, Ann	LA20	lecturer-in-charge

Offered in the following programmes in 2024-2025	crdts	offering
Master of Science in Sustainable Land Management(main subject Land and Groundwater Management)	5	A
International Master of Science in Soils and Global Change (main subject Physical Land Resources and Global Change)	5	A
International Master of Science in Soils and Global Change (main subject Soil Ecosystem Services and Global Change)	5	A
Master of Science in Sustainable Land Management(main subject Urban Land Engineering)	5	A
Master of Science in Bioscience Engineering: Land, Water and Climate	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

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

Definition, importance, general causes and consequences of different types of land degradation. The land degradation types structural soil degradation, soil compaction, decline in soil organic matter, and salinization and alkalinisation are discussed, 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, some major soil protection strategies are highlighted.
The practicals comprise coached (PC-)exercises related to the (integrated) assessment of different types of soil degradation, assessing aridity and climate variability, identification of soil degradation risk areas, an introduction on economics of soil degradation. Relevant data collection procedures are tackled in other courses (e.g. Soil Physics). This course focusses on analysis and interpretation of the field data in a context of land/soil degradation.

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 Display integrative thinking on soil degradation and land management

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

Group work, Seminar, Lecture, Independent work

Extra information on the teaching methods

Seminar: coached (PC-)exercises
Independent work: homework, can consist of introductory instructions to practical sessions and/or finalisation of individual reports
Group work: homework, can consist of introductory instructions to practical sessions and/or finalisation of group reports

Study material

Type: Syllabus

Name: Soil Degradation
Indicative price: Free or paid by faculty
Optional: no
Language : English
Number of Pages : 350
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No
Additional information: Course notes - part theory

Type: Slides

Name: Soil Degradation
Indicative price: Free or paid by faculty
Optional: no
Language : English
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No
Additional information: Powerpoint presentation (pdf-formaat) as used during lectures - part theory

Type: Software

Name: GIS software - QGIS
Indicative price: Free or paid by faculty
Optional: no
Available on Athena : Yes
Online Available : Yes

Available in the Library : No
Available through Student Association : No
Usability and Lifetime within the Course Unit : one-time
Additional information: One of the exercises uses QGIS

Type: Other

Name: Soil Degradation - digital materials in support of the exercises
Indicative price: Free or paid by faculty
Optional: no
Language : English
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No
Additional information: Tasks, PowerPoint presentations, datasets, literature, en video-recordings to support the exercises

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.

Assessment moments

end-of-term and continuous assessment

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

Written assessment with open-ended questions

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

Oral assessment, Written assessment with open-ended questions

Examination methods in case of permanent assessment

Skills test, Participation, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

The end-of-term assessment will assess the knowledge and insight of the student in different land/soil degradation processes, assessment and control using open questions.

With respect to the continuous assessment, the students will be evaluated based on their participation throughout the semester and the individual and group assignments following the various practicals. The following aspects will be evaluated:

- the acquired **skills**, evaluating to what extent calculations, software were correctly done/used, and
- the ability to critically and thoroughly analyse specific cases, come to integrated conclusions (**assignment/participation**)

Deadlines for submission of the reports need to be strictly respected. Each student is held responsible for the timely submission of the reports. Each student is expected to contribute to the practicals and to the group report.

In case of non-passing in the first exam session, the scores obtained on the continuous assessment are transferred to the second session exam.

Calculation of the examination mark

- Period-aligned evaluation: 65%
- Non-period aligned evaluation: 35%

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

Unfoundedly eschewing a practical for this course unit leads to a score of 0 for that report. In case of foundedly eschewing the practical sessions, a solution is searched; this can imply that (an) alternative task(s) is provided.