GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2026-2027

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 2027-2028

A (semester 2)	English	Gent	group work lecture seminar

Lecturers in academic year 2027-2028

Verdoodt, Ann	LA20	lecturer-in-charge

Offered in the following programmes in 2027-2028	**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 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 degradation assessment, soil structural degradation, soil compaction, salinization, decline in OM, aridity, desertification, soil protection and 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 practical sessions comprise seminars (= 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, and can explain the behaviour of soils on

the basis of their physico-chemical properties.
- 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 Define and correctly use terminology related to soil degradation and desertification in oral and written communication.
2 Explain and critically evaluate the processes, drivers, and impacts of soil degradation across different environmental contexts.
3 Select indicators, analytical methods, and mapping approaches to assess soil degradation and soil conservation status across spatial scales (field to regional/global).
4 Interpret and critically assess analytical soil data in relation to soil degradation processes and soil quality.
5 Select and justify sustainable soil protection and conservation measures for specific environmental and land-use contexts.
6 Apply systems thinking to soil degradation and sustainable land management, including the economic dimensions, trade-offs, and decision-making context of soil conservation.

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

Extra information on the teaching methods

Seminar: coached (PC-)exercises
Group work: some sessions of the continuous assessment comprise group work or a combination of individual and group work. The group work involves combining calculations, joint analysis and discussion to solve research questions, presenting the results in a slide presentation or by writing an assignment.

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

Participation, Presentation, 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

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 during a number of sessions spread throughout the semester. The evaluation comprises individual and group assignments, as well as group presentations. 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, respond to research questions and come to integrated conclusions

(**assignment/presentation/participation**)

Each student is expected to contribute to the assignments and presentations. Most tasks need to be finalised by the end of the practical sessions. For more elaborated assignments, an extended deadline is communicated. These deadlines need to be strictly respected.

Calculation of the examination mark

Combined final score = a score on the continuous assessment (i.e. assignments, presentations, participation being 35%) and a score on the end-of-term evaluation (i.e. written exam, 65%)

Attendance of all seminars is obligatory. In case of foundedly eschewing a seminar, an alternative task can be provided. Unfoundedly eschewing a seminar for this course unit can lead to an assignment or participation score of 0.

A student that is not participating in the continuous assessment, can not pass for this course. Should, in this case, the final score calculation result in a score of at least 10/20, the final score will be changed into the maximum non-passing score (9/20).

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

In case of non-passing in the first exam session, but passing on the continuous assessment, the scores obtained on the continuous assessment are transferred to the second session exam. If the student would have a non-passing score for the continuous assessment, an alternative task will be developed, taking into account the observed knowledge/skills gaps.