GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2026-2027

Land Evaluation (I002699)

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
			peer teaching
			independent work

Lecturers in academic year 2027-2028

Verdoodt, Ann	LA20	lecturer-in-charge
Derycke, Anja	LA20	staff member

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 Geology	5	A
Exchange Programme in Bioscience Engineering: Ecosystem Management (master's level)	5	A
Exchange Programme in Bioscience Engineering: Land and Forest management (master's level)	5	A

Teaching languages

English

Keywords

soil quality, urban soil functions, land suitability, ecosystem services, GIS

Position of the course

The demands on soil are high. Across the world, land-use decisions are constantly being made: expanding agriculture, restoring degraded landscapes, planning urban development, or adapting to climate change. Soils themselves are challenging ecosystems of interacting physical, chemical and biological factors. How can we deal with this complexity and translate it into easily understandable scoring systems that inform and support land planners and managers in their decisions? **Land evaluation** sits exactly at this fascinating intersection. The ultimate goal are strategic medium to long-term decisions for sustainable, climate proof land use and management.

In this course, **climate, topography, soils and land cover interact** to determine how landscapes function. We explore how these components control the **sustainable performance of land uses** and the capacity of soils to deliver essential **ecosystem services** such as food production, water regulation, and carbon storage. We provide the scientific foundation for real-world decision making, from farm management to global land-use planning.

Building on your backgrounds, the course offers a gateway into **applied soil science**. You will discover how soils both shape and inform on the opportunities and limitations of land management. This requires tailored land evaluation tools. From **natural ecosystems to intensively managed or disturbed**

environments, and from global assessments to field-scale applications, land evaluation equips you to translate geoscientific knowledge into **actionable insights for sustainable land management**.

Contents

Students learn how to use the land evaluation terminology and concepts and how to judge and apply a number of existing tools. Interpretation of results is oriented towards land use planning, land consolidation and soil protection policies at local and regional scales.
The following aspects will be addressed:
- Origin, terminology, principles of land evaluation
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- Soil quality
- Urban soil functions/ecosystem services
- Land suitability
- Dealing with uncertainty in land evaluation

Initial competences

The student
- has basic insight in the composition of soils and their behaviour on the basis of their standard physico-chemical properties.
- can perform spatial analyses using GIS software on digital maps representing vector and raster data structures

Final competences

1 Define and correctly use terminology, concepts, and principles of land evaluation and communicate them clearly to expert audiences.
2 Select and justify the use of diagnostic indicators, scoring systems and arithmetic combinations including their advantages, limitations, and suitability for specific applications.
3 Apply and critically assess existing land evaluation techniques to evaluate soil quality, land suitability, and ecosystem services in rural and urban environments.
4 Adapt land evaluation approaches to specific environmental and socio-economic contexts, including the integration of soil degradation or climate change scenarios in a GIS environment.
5 Critically reflect on recent developments and emerging technologies in land evaluation and assess their relevance for practical applications.
6 Collaborate in interdisciplinary teams and communicate land evaluation methods and results clearly, critically, and professionally.

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, Peer teaching

Extra information on the teaching methods

Seminar: series of guided exercises (individual or in group)
Peer teaching: the groups introduce their fellow students to the methodological approach adopted in a scientific paper of their own interest (related to land evaluation).
Independent work: homework, being preparation of practical sessions by watching short instruction video's or reading guidelines and - when needed - finalisation of individual reports
Group work: homework being finalisation of group reports and preparation of microteaching activity

Study material

Type: Syllabus

Name: Land Evaluation
Indicative price: Free or paid by faculty
Optional: no

Language : English
Number of Pages : 300
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: Land Evaluation
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 : intensive
Additional information: Intensively used during multiple exercises

Type: Other

Name: Digital materials in support of the practical 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, and video-recording to support the exercises

References

- UNEP (2016). Unlocking the sustainable potential of land resources: evaluation systems, strategies and tools. A report of the working group on land and soils of the international resource panel.
- Nguyen, T.T., Verdoodt, A., Tran, V.Y., Delbecque, N., Tran, T.C., and Van Ranst, E. (2015). Design of a GIS and Multi-criteria Based Land Evaluation Procedure for Sustainable Land-use Planning at the Regional Level. Agriculture Ecosystems & Environment 200: 1–11.
- Constantini, E.A.C. (2009). Manual of Methods for Soil and Land Evaluation. Science Publishers.
- FAO (2007). Land evaluation. Towards a revised framework. FAO Land and Water Discussion paper n°6. FAO, Rome. (http://www.fao.org/NR/lman/abst/lman_070601_en.htm)
- Lehmann, A., David, S., Stahr, K. (2006). TUSEC – Technique of urban soil evaluation in city regions – a method for the assessment of natural and anthropogenic soils. Hohenheim.
- FAO (2003). Global agro-ecological assessment for agriculture in the twenty-first century (CD-ROM). FAO Land and Water Digital Media Series n° 21, FAO, Rome. (http://www.fao.org/ag/agl/agll/gaez/index.htm)
- Verdoodt, A. and Van Ranst, E. (2003). A Two-Level Crop Growth Model for Annual Crops. Ghent University, Laboratory of Soil Science, Ghent (available in library)

- Sys, C., Van Ranst, E., Debaveye, J. and Beernaert, F. (1991, 1993). Land Evaluation. Part I, II and III, Agricultural Publ. N° 7, ABOS, Brussels (being revised)

Course content-related study coaching

Personal coaching before and after the lectures and during the guided exercises. Feedback about the corrected applications 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

Presentation, Peer and/or self 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

End-of-term assessment:
The end-of-term assessment is a written examination (closed book) comprising theoretical questions with more emphasis on general comprehension of the basic principles, boundary conditions, and scope of application of the different land evaluation tools than on encyclopaedic knowledge, as well as questions that check the students individual understanding of the practicals.

Continuous assessment:
During the course of the semester, students have to submit **individual and group assignments**. Deadlines for submission need to be strictly respected. Depending on the seminar, up to three aspects can be evaluated:
- the acquired **skills**, evaluating to what extent calculations, software were correctly done/used,
- the ability to critically and thoroughly analyse specific cases, come to integrated conclusions, and
- an assessment on your performance and growth as team member in different roles by your peers (**peer-assessment**).

At the end of the semester, students will present the scientific paper of their interest to the fellow students (**peer teaching**). Each student contributes by presenting part of the paper, and participating in question and answer sessions (= **presentation**).
Each student is held responsible for the timely submission and reporting of (a part of) the practicals. Each student is expected to contribute to all practicals, (group) reports and peer teaching. The group members can organise themselves and agree upon a fair task distribution. Through peer assessment they help each other in understanding and exploiting/correcting their strengths and weaknesses when working in a team.

Calculation of the examination mark

Combined final score = a score on the continuous assessment (i.e. assignments, presentations, participation being 60%) and a score on the end-of-term evaluation (i.e. written exam, 40%)
Attendance of the practical sessions is obligatory. In case of foundedly eschewing a practical session, (an) alternative task(s) can be provided. Unfoundedly eschewing a practical for this course unit can lead to a score of 0 for that assignment.
The lecturer can decide to deviate from or not consider the **peer assessment** scores at all when determining individual scores per student for the group tasks.
A student that is **not participating in the end-of-term evaluation**, 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-deliberable score (7/20).
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.