GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2026-2027

Land Information Systems (I002774)

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 2026-2027

A (semester 1)	English	Gent	lecture
			group work

Lecturers in academic year 2026-2027

Vancoillie, Frieke	LA20	lecturer-in-charge

Offered in the following programmes in 2026-2027	**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
International Master of Science in Soils and Global Change (main subject Soil-Plant System Processes and Global Change)	5	A
Master of Science in Sustainable Land Management(main subject Urban Land Engineering)	5	A
Exchange Programme in Bioscience Engineering: Land and Forest management (master's level)	5	A

Teaching languages

English

Keywords

Geografic information systems, digital data bases, spatial data analysis

Position of the course

This course consists of two parts: a basic module and an in-depth module with integrated applications for land management. The basic module takes six weeks, the integrated applications take five weeks.

Basic module

In this module the basic principles of digital geocoded information systems are treated. The full cycle of acquisition, management, processing, visualisation, integration and communication of geographic data is handled. The main functions applied for land management are reviewed. During the exercises, the students can acquire basic skills pertaining to GIS data analysis. The exercises are performed with free and open source software (FOSS) installed on the students' aptops (BYOD).

Integrated applications

This module builds on the basic module. Using advanced GIS techniques, students search for solutions for real-world environmental problems by integrating the various environmental components of soil, water, forest and nature.

Contents

Basic module

The following aspects are addressed systematically: GIS concepts, geospatial data structures, data input, data display, data query, data analysis and data output. The exercises are tasks that are independently performed with QGIS. As the course progresses, the complexity of the exercises increases. The treated geospatial problems are taken from real life: e.g.volumetric assessment of the Antarctic icecap, emergency planning in case of nuclear plant failure, suitability analysis for palm oil plantations, etc.

Integrated applications

The students are given one or more environmental problems, which are not only more complex than in the basic module, but also require an integrated approach. In groups, they first critically analyse the problem and then design and implement a solution methodology. The solution protocol including the results are reported extensively. In conclusion, the students present their teamwork (presentation) meanwhile thoroughly debating the applied spatial analysis techniques.

Initial competences

Basic knowledge of informatics

Final competences

1 Identify the function of the different components of a GIS
2 Identify the properties of a geographic data model (including scale, projection, coordinate system, etc.) and use these properly
3 Distinguish the characteristics of raster and vector data and integrate these into applications
4 Identify the basic principles of relational databases and link them with a GIS
5 Retrieve relevant geospatial data for a particular task
6 Critically analyse a spatial problem and solve it independently
7 Design of cartographic information needed in decision-making
8 Select and use available hardware, software and expertise purposefully
9 Creatively exploit knowledge related to GIS concepts and techniques in spatial analysis and modeling assignments
10 Writing a high-quality scientific report with respect to a spatial analysis
11 Present a scientifically high-quality group presentation on a spatial analysis
12 Apply these insights and skills for environmental applications related to vegetation, soil and water 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

The theoretical lessons are on-campus lectures. The practical exercises are supervised practicals and seminars in an online setting.

Study material

None

References

- Longley, P.A., Goodchild, M.F., Maguire, D.J., Rhind, D.W. 2015. Geographic Information Science and Systems. 4th Edition. Wiley
- Burrough, P., McDonnell, R.A., Lloyd, C.D. 2015. Principles of Geographic Information Systems. 3rd Edition. Oxford University Press
- Heywood, I., Cornelius S., Carver, S. 2012. An Introduction to Geographic Information Systems. Pearson Education Limited, Prentice-Hall
- DeMers M.N. 2017. Geographic Information Systems in Action. 1st Edition. Wiley.

Course content-related study coaching

Ad hoc after the lessons or during practicals; through Ufora

Assessment moments

end-of-term and continuous assessment

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

Skills test

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

Skills test

Examination methods in case of permanent assessment

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 skillstest is a practical exam that assesses the extent to which students can adequately perform the desired GIS skills.

Calculation of the examination mark

Skills test: 60%
Tasks: 10%
Team work (incl. participation): 30%

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