GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2019-2020

GIScience & Technology (GIST) (C003543)

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

Credits	5.0	Study time	150 h	Contact hrs	40.0 h

Course offerings and teaching methods in academic year 2019-2020

A (semester 1)	English	lecture	25.0 h
		self-reliant study activities	10.0 h
		microteaching	5.0 h
		group work	10.0 h

Lecturers in academic year 2019-2020

Van de Weghe, Nico	WE12	lecturer-in-charge

Offered in the following programmes in 2019-2020	crdts	offering
Master of Science in Teaching in Science and Technology (main subject Geography)	5	A
Master of Science in Geography	5	A
Master of Science in Geomatics and Surveying	5	A
Exchange programme in Geography (master's level)	5	A
Exchange programme in Geomatics (master's level)	5	A

Teaching languages

English

Keywords

Geographical information science, GITechnology, spatio(-temporal) modelling, geographical information systems, geoinformatics, data structures, complexity, time geography, location tracking, moving objects

Position of the course

Today, many technologies which are used to build, manage, process, present, integrate and/or communicate geographical/spatial data. First, we obviously think on GISystems and various extensions for specific research of networks, 3D, geostatistics, transport, movement, ... More and more, these extensions start their own life and we can no longer speak of traditional GISystems, but we need to speak about more advanced GISystems such as 3D-GIS (GISystem for 3D), TGIS (temporal GISystem), GIS-T (GISystem for transport), HGIS (historical GISystem) ... All have their strengths and weaknesses, and take an increasingly important role in certain niches. Besides these advanced GISystems, there are currently many other technologies that are used to build, manage, process, present, integrate and/or communicate about geographical/spatial data. First, there are the 'established values' such as GPS, total stations. On the other hand, new technologies are currently evolving very fast, both from fundamental and applied fields for both the scientist and for the average citizen. Well-known examples are the smartphones and Google Earth. It is clear that they no longer can be shared in real GISystems. However, they constitute a very important and interesting group and they certainly deserve their place in a course where the 'technical side of the geography-practice' takes an important place.
The field of geographical information science (GIScience) can be described as that part of information science that studies geographical information. The central goal of GIScience is to optimise geographical informtion systems (GISystems), its extensions, and GITechnological developments.
This course aims at acquiring a thorough basic understanding regarding GITechnology and its scientific fundaments. Specific attention goes to the research of moving objects (cars, bikes, pedestrians, visitors, animals, ...).

Contents

Tracking

Advanced GIS
Geovisualisation
Kwalitative spatial reasoning (kwalitative versus kwantitative, kwalitative calculi in space, trends in spatial reasoning)
Semantics and ontology of spatio(-temporal) information
Spatial similarity measures
Vague/incomplete data
Time geography
Spatio(-temporal) cognition
Spatio-temporal data mining
Cellular automata
Agent based models
+
Exercises with respect to Moving Objects (theoretical and practical exercises)

Initial competences

Knowledge of general concepts related to geographic information systems.
Basic knowledge of programming.

Final competences

1 Apply methods of GIScience.
2 Have a critical overview of international research in GIScience.
3 Know the recent developments in GIScience.
4 Analyse complex space(-time) phenomena.
5 Control advanced concepts and knowledge of GIScience.
6 Contribute to the research of applications in geo-information science.
7 Individually formulate and analyse research questions concerning a research theme in GIScience.
8 Describe and use models and calculi in GIScience.
9 Critically reflect on one's own thinking within GIScience and related disciplines.
10 Represent a written report.
11 Orally present and defend research results.
12 Describe and reason about the interaction between GIScience and society.
13 Perform independent scientific studies.

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, lecture, microteaching, self-reliant study activities

Extra information on the teaching methods

Lectures (25 hours)
Independent work (10 hours)
Group work (10 hours)
Microteaching (5 hours)

Learning materials and price

Slides (via Ufora) + syllabus (via Ufora) + own notes

References

Heywood, I., Cornelius, S. & Carver, S., 2011, An introduction to Geographical Information Systems.
Egenhofer, M.J. & Golledge, R.G., 1998, Spatial and temporal reasoning in geographic information systems.
Longley, P.A., Goodchild, M.F., Maguire, D.J. & Rhind, D.W., 2005, Geographic information systems and science.
Worboys, M.F., 2001, GIS: a computing perscpective.

Course content-related study coaching

By the practical assistants
Interactive support using Ufora

Evaluation methods

end-of-term evaluation and continuous assessment

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

Oral examination

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

Oral examination

Examination methods in case of permanent evaluation

Assignment, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Calculation of the examination mark

Non-periodical: 30%.
Periodical: 70%.
Students need to pass for non-periodical as well as for periodocal evaluation.