3D Acquisition and Modelling (C004180)

Due to Covid 19, the education and assessment methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

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

Credits 5.0	**Study time** 150 h	**Contact hrs**	55.0h

Course offerings and teaching methods in academic year 2020-2021

A (semester 1)	Dutch	Gent	fieldwork	20.0h
			project	20.0h
			lecture	15.0h

Lecturers in academic year 2020-2021

De Wulf, Alain	WE12	lecturer-in-charge
Goossens, Rudi	WE12	co-lecturer

Offered in the following programmes in 2020-2021	crdts	offering
Master of Science in Teaching in Science and Technology(main subject Geography and Geomatics)	5	A
Master of Science in Geography and Geomatics	5	A

Teaching languages

Dutch

Keywords

3D- registration & visualization, laser scanning, technical photography, terrestrial photogrammetry, photo modelling, CAD.

Position of the course

This course aims to integrate four subject areas and courses:
- Laser scanning: acquisition, data analysis and modeling
- Photogrammetry: high-quality technical photographic recordings and processing of terrestrial photogrammetry to 3D models and orthophotoplans.
- Photo modelling: acquisition and processing into 3D models and orthophotoplans.
- Use of CAD software for the visualization of the models.

The intention is that students can create, visualize and integrate a digital representation of buildings using a variety of methods (laser scanning, photogrammetry and photo modeling) in a CAD environment.

Contents

- Theory and practice of laser scanning
- Theory and practice of technical photographic recordings.
- Theory and practice of terrestrial photogrammetric restitution
- Theory and practice of photo modeling of buildings.
- Practice of 3D generation and visualization of the terrain reality - Photo modelling - Visualization with CAD.

Initial competences

The initial knowledge that is treated in the courses: Engineering Surveying, Topometry and Remote Sensing.

Final competences

1 Analyze the error sources of laser scanning devices and evaluate the size of each error.
2 Being able to set up and configure a laser scanning device, then to be able to perform the laser scanning.

3 To be able to take a technically perfect photo by selecting suitable mounting
   points and optimally setting the camera.
4 Assess the quality of a laser scanning and photo recording performed and, if
   insufficient, know which parameters need to be corrected to remedy this.
5 Both laser scan point clouds and terrestrial technical photos of buildings can be
   processed with software packages into a three-dimensional model and into
   ortho-photo plans of that building.
6 Producing a suitable visualization of the three-dimensional models of buildings
   with CAD software.

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

Lecture, Project, Fieldwork

Learning materials and price

The slides of the lessons are made available, in addition to a whole series of
readers. By providing an extensive questionnaire, it is clear to the students which
topics from these readers must be known. Price: none

References

- J.C. McGlone 2004 Manual for Photogrammetry, Am Soc for Photogramm. And
  Rem.
- Sens. Maryland
- Worboys, M.F., 1995, Geographic Information Systems: A Computing Perspective,
- Taylor and Francis, London.
- Longley, P.A., Goodchild, M.F., Maguire, D.J. en Rhind, D.W., 2001, Geographic
- Information Systems and Science, Wiley, New York.
- Boeklagen, R., 2007, AutoCad 2007, Computerondersteund Ontwerpen, TEC /
  CAD College.

Course content-related study coaching

On appointment

Assessment moments

end-of-term and continuous assessment

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

Written examination, Oral examination

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

Written examination, Oral examination

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

- Written (Project Work + Theory)
- Oral explanation by student (Project Work + Theory).

Calculation of the examination mark

- Non-periodical for the project work (2/3 of the point total)
- Periodically for the theoretical part (1/3 of the point total).