AH2915 Laser Scanning Technology 7.5 credits

Laserskanning

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for AH2915 valid from Autumn 2014

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

The Built Environment

Specific prerequisites

For admitted students to the Master of Science in Civil Engineering and Urban Management (CSAMH) or the Master of Science in Transport and Geoinformation Technology (TTGTM): AG2925 Geodata quality

Other students should have:

- A completed bachelor's degree in civil engineering, urban planning, geomatics, geography, engineering physics, computer science, statistics, economics, and/or mathematics, including at least 6 university credits (hp) in each of the following or their equivalents: Programming, Linear Algebra, Calculus in One Variable, and Probability & Statistics; and

- Documented proficiency in English corresponding to English B.
- AG2925 Geodata quality or equivalent course

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

To give students theoretical and practical knowledge about the laser scanning measurement procedure, data processing and modelling.

- understand principle of terrestrial and airborne laser scanning
- know how and where to use the laser scanning technology
- plan and perform a terrestrial laser scanning project
- register point clouds taken from different stations
- georeference, segment and classify the point clouds
- fit geometrical primitives to point cloud
- create digital terrain model from LS data
- map the images (textures) onto point cloud
- create animated flythrough of the model
- publish the model on Google Earth

Course contents

- Basic principles of laser scanners and electronic distance measurement
- Terrestrial and air-born laser scanning
- Metrological aspects: error analysis and calibration
- Transformation (registration) of multiple scans
- Different methods for geo-referencing of laser scanning data
- Basic principles of inertial navigation system, its combination with GPS and its use for georeferencing of airborne data
- Different methods for point cloud visualization
- Data processing and modeling

Disposition

Lectures 20h

Laborations 48h

Course literature

Jie Shan and Charles K. Toth (2009). Topographic Laser Ranging and Scanning Principles and Processing. CRC Press 2009, Print ISBN: 978-1-4200-5142-1, eBook ISBN: 978-1-4200-5143-8

HDS training manual.

Examination

- PRO2 - Project, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB2 - Laboratory Work, 2.0 credits, grading scale: P, F
- TEN1 - Examination, 2.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

- LAB2 - Laboratory Work, 2,0 cr, grade scale: P, F
- PRO2 - Project, 3.0 cr, grade scale: A, B, C, D, E, FX, F
- TEN1 - Exmination, 2,5 hp, grade scale: A, B, C, D, E, FX, F

Other requirements for final grade

Approved lab reports

Project work report, at least grade E

Examination, at least grade E

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.