

## Faculty common course 2021

English course title:

3D visualization and interpretation of geographic data

Swedish course title:

3D-visualisering och tolkning av geografiska data

Extent (credits): 3 hp

Language of instruction:

English

Recommended prerequisites:

Acceptance to PhD education

Learning outcomes of the course:

This course aims to provide practical skills in GIS that can be useful for the later 3D interpretation. The idea is that the student becomes more effective in GIS and 3D modelling interpretation software, that are useful for their research. They will be introduced to a range of tools that will enable to be more productive. Moreover, with the concepts taught in this course, students will be able to create scientific surveys plans for future field camps, allowing them to be more independent during their research. This will improve the students' ability to collaborate and/or organize future field camps within their study area, that will benefit their research group and their future employment.

Specify which learning outcomes of the doctoral degree that are address/covered (see appendix 1 of the call or the template of ISP). Describe how:

On the completion of the course, the student should be able to:

- Manipulate, extract and treat quantitative data from different geodata sources
- Explain the theoretical principals in the analysis of geographical data
- Develop an appropriate work plan for spacial analyses and apply these in the natural sciences and/or civil engineering
- Interpret and extract information from satellite data for various purposes
- Formulate, carry out and present an independent scientific project using GIS and 3D visualization tools
- Build a 3D model with GIS and photogrammetry tools.

Course contents:

This course contents include:

- 1) introduce the knowledge of GIS, photogrammetry and 3D graphical modelling: a short introductory lecture on Remote sensing, Geographical Information Systems and photogrammetry; instrumentation, gadgets and software; information about the different database with available data regarding earth sciences;
- 2) Geographical representation of a field camp note, by using QGIS. Import of geographic data from a database and structure parameters (type, location and orientation) from field camp notes. Export data for 3D visualization and interpretation.

3) 3D scan of an object or area to calculate their volume by using PIX4D and Cloudcompare.

4) 3D visualization and interpretation of geological structures, from the field camp notes and other potential data, at depth by using GemPy and LeapFrog.

Instruction (course structure):

The course will be taught as a 1 week seminar (40 hours) seminar with many hands-on examples. Students will work in pairs on a computer/laptop. The course can be adaptable to be an on-line course.

Assessment (form of examination):

Examination is based on attendance (>90%) and participation in an individual field camp survey plan (10h).

Course examiner (name, e-mail):

Karin Höghdal, Karin.Hogdahl@geo.uu.se

Department with main responsibility:

Dept. Earth Sciences: Geophysics

Contact person/s (course responsible teacher) (name, e-mail):

Alba Gil de la Iglesia, alba.gil@geo.uu.se

Course dates/period: 18th January to 22nd March

Maximum number of participants: 15

Submit the application for admission to: 2020-12-17

Submit the application not later than: 2021-01-11