



## DEPARTMENT OF EARTH SCIENCES

### **GV2300 Remote sensing and GIS, 7.5 credits**

Fjärranalys och geografiska informationssystem (GIS), 7,5 högskolepoäng

*First Cycle*

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#### **Confirmation**

This course syllabus was confirmed by Department of Earth Sciences on 2020-01-14 to be valid from 2020-08-31, autumn semester of 2020.

*Field of education:* Science 100%

*Department:* Department of Earth Sciences

#### **Position in the educational system**

The course includes 7,5 credits at the undergraduate level. The course is offered as an elective course subject to availability.

The course can be part of the following programmes: 1) Master's Programme in Geography (N2GEO) and 2) Bachelor's Programme in Earth Sciences (N1GVS)

#### *Main field of studies*

Earth Sciences

#### *Specialization*

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

#### **Entry requirements**

For admission to the course, 7,5 credits in Geographic Information Systems and at least 45 credits in the main field of Earth Sciences, Geography or Marine Sciences is required. Applicants with equivalent education can, after review and approval, be given access to the course.

#### **Learning outcomes**

On successful completion of the course the student will be able to:

*Knowledge and understanding*

- identify current remote sensing data sources, their characteristics and applications, as well as have knowledge about future developments in remote sensing.
- understand the physical basis behind the response from remote sensing data.
- understand basic analysis methods of remote sensing data.

*Competence and skills*

- independently search for and visualize remote sensing data.
- carry out basic analysis of 2D and 3D remote sensing data using different software.
- establish flight plans for unmanned aerial vehicles (UAV)/drone missions.
- write some basic scripts with current tools (e.g., Python and R).
- communicate results from analyses via visualization in GIS.

*Judgement and approach*

- interpret and apply accuracy assessment reports from remote sensing data and its products.
- motivate choice of remote sensing data for various applications.
- evaluate the status and effect of locational accuracy in remote sensing and GIS data.
- critically analyze scientific literature in the subject.

**Course content**

The aim of the course is to provide in-depth knowledge in remote sensing in connection with geographical information systems (GIS), to provide in-depth exercise in the practice of remote sensing, and to provide in-depth knowledge of principles for the introduction and application of remote sensing. Remote sensing data sources are both 2D (e.g., satellite spectral data) and 3D (e.g., point clouds from LiDAR or photogrammetry).

The majority of the course is devoted to practical exercises with various software related to remote sensing and GIS, along with lectures and reading that provide an introduction to theory, application areas, drone flight planning, data analysis, and scripting for data processing. The course prepares student for independent work in future project courses.

**Form of teaching**

A major part of the course is devoted to practical exercises with various software related to remote sensing and GIS. Both commercial and open source software will be used. The teaching includes lectures, reading of literature, discussion seminars, an excursion and computer exercises.

*Language of instruction:* English

### **Assessment**

The student will be examined by:

Moment 1 Assignments, 4,5 credits: U/G

Moment 2 Examination, 3 credits: U/G/VG

Moment 2 determines the course's final grade, which is only issued after Moment 1 has been approved. All grades, including compulsory parts, are required for a final grade for the course.

If a student, who has failed the same examined element on two occasions, wishes to change examiner before the next examination session, such a request is to be submitted to the department in writing and granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In the event that a course has ceased or undergone major changes, students are to be guaranteed at least three examination sessions (including the ordinary examination session) over a period of at least one year, though at most two years after the course has ceased/been changed. The same applies to work experience and VFU, although this is restricted to just one additional examination session.

### **Grades**

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

For the grade Pass (G) in the course the grade Pass (G) for the moment 1 and 2 is needed. For the grade Pass with Distinction (VG), the grade Pass (G) in moment 1 and the grade Pass with Distinction (VG) in moment 2 are needed.

### **Course evaluation**

The students are given the opportunity to make a anonymous written evaluation of the course.

The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.

**Additional information**

Students admitted to NIGVS Bachelor's Programme in Earth Sciences have precedence for admittance to the course.