Faculty of Science

GISN08, GIS: Digital Remote Sensing and GIS, 7.5 credits
GIS: Digital fjärranalys och GIS, 7,5 högskolepoäng
Second Cycle / Avancerad nivå

Details of approval
The syllabus was approved by Study programmes board, Faculty of Science on 2007-06-14 to be valid from 2007-07-01, autumn semester 2007.

General Information
The course is an elective course for second-cycle studies for a Degree of Master of Science (120 credits) in geographic information science.

Language of instruction: English

Main field of studies
Physical Geography

Depth of study relative to the degree requirements
A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes
The course highlights the use of digital remote sensing (satellite images) for image interpretation of e.g. land use, understand the spectral properties of different objects and temporal differences at seasonal level or trends over longer periods for detection of changes.
The aim of the course is that students should be able to:

Knowledge and understanding
Account for:

- basic electromagnetic radiation theories and the influence of the atmosphere on incoming radiation,
- the radiometric and spectral resolution of a satellite image, in raw format as well as conversion to physical properties,
- image classification algorithms for digital satellite data as well as practical experience,

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reflection characteristics of different objects in different wavelength bands,
accuracy assessment and sampling methods,
how information is extracted from multiple satellite data to study seasonal effects
how satellite data can be used to calculate trends for long time series as well as
create a resultatkarta that describes change over the time.

**Competence and skills**

- carry out and report an image interpretation project independently
- extract statistics and other information from satellite data,
on-screen digitising
carry out both automatic and supervised classification of digital satellite data,
carry out an accuracy assessment of a classification
carry out analyses of satellite data integrated with other geographic information
  in a geographic information system.

**Judgement and approach**

The student is expected to be able to:

- evaluate and discuss choice of satellite data and analytical method to solve a
  given problem
- critically review, evaluate and discuss the reliability of classifications that are based
  on satellite data.

**Course content**

The course consists of the following six components.

- Electromagnetic radiation theory
- Satellite image classifications and classification accuracy assessment in theory and
  practice
- Classification algorithms, classification of high resolution satellite images
- Phenologic changes of vegetation during the growing season.
- A change detection study over a 20 years time series of satellite data.
- Downloading of free satellite data, importing data and conversion to physical
  units.

**Course design**

The course is a distance course and is distributed on the Internet. It is flexible designed
which facilitate for the student to carry out the course on full-, half-, or part-time.

**Assessment**

Examination takes place through written open book examination at the end of the
course combined with grading of written assignments and project work during the
course. For students who have failed the regular examination, additional occasion in
close connection to this is offered.
Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass.
To pass the entire course, approved examination, passed written assignments and passed project reports are required.

Entry requirements

For admission to the course the following courses (or equivalent) are required: English B and 90 credits including 30 credits GIS.

Further information

The course may not be included in degree together with

GIS417 Digital remote sensing and GIS, 5 credits
NGE609 Remote sensing and biogeosphere dynamic processes, 10 credits
NGENXX Satellite remote sensing, 15 credits
VFT051 Remote sensing, 5 credits
VFTXX Remote sensing, 7.5 credits

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Subcourses in GISN08, GIS: Digital Remote Sensing and GIS

Applies from H07

0701  Digital Remote Sensing and GIS, 7,5 hp
       Grading scale: Fail, Pass