



Department of Earth and Environmental Sciences

## GISN07, GIS: GIS and Algorithms, 7.5 credits

*GIS: Algoritmteori i GIS, 7,5 högskolepoäng*

Second Cycle / Avancerad nivå

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### Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-03-01 and was last revised on 2013-01-17. The revised syllabus comes into effect 2013-01-17 and is valid from the spring semester 2013.

### 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.

*Language of instruction:*

*Main field of study Specialisation*

Physical Geography            A1F, Second cycle, has second-cycle course/s as entry requirements

### Learning outcomes

In the basic courses, the students have got familiar with basic theory of GIS and to use GIS as a tool in geographic analyses. The aim of this course is to give the underlying mathematical and computer science theory to a GIS. This knowledge is necessary to evaluate the results in an analysis and to carry out more advanced analyses where the tools not are available in a standard GIS program.

*Knowledge and understanding* On completion of the course, the student should be able to:

- explain theory behind the basic algorithms (for raster and vector data) that are used in geographic information processing,
- analyse spatial concepts and account for the definitions of these
- suggest an appropriate procedure to solve a geometric problem in geographic information processing,
- thoroughly describe and derive empirical transformations in a surface
- explain how curves are used to represent geographic information

- explain basic graphic algorithms as t.ex. closest path in network analysis, and
- account for spatial data structures.

*Skills and ability* On completion of the course, the student should be able to:

- program basic algorithms that are used in geographic information processing and
- structure and solve geometric problems.

*Judgement and approach* On completion of the course, the student should be able to:

- demonstrate a reflecting approach to possibilities and limitations in a GIS program.

## **Course content**

The lectures treat the basic theory of spatial data structures and the most important algorithms in a GIS. Exercises are mainly directed towards programming algorithms.

## **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 take-home examination at the end of the course combined with passed written assignments and independent advanced assignments during the course.

For students who have failed the regular examination, additional occasion in close connection to this is offered.

## **Grades**

Grading scale includes the grades: Fail, Pass

To pass the entire course, approved examination, passed written assignments and passed reports from independent advanced assignments are required.

## **Entry requirements**

General entry requirements including English B and 90 credits including 30 credits GIS.

## **Further information**

The course may not be included in a higher education qualification together with:

GIS418 Algorithm theory in GIS, 5 credits

NGE612 Algorithms in geographic information management, 5 credits

NGEN06 Algorithms in geographic information processing, 7.5 credits

TEK230 Algorithms in geographic information management, 5 credits

TEK230 Algorithms in geographic information processing, 7.5 credits