



Faculty of Science

NGEU20, Algorithms in Geographical Information Systems, 7.5 credits

Algoritmer i geografisk informationsbehandling, 7,5 högskolepoäng
Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2019-12-04 to be valid from 2019-12-04, autumn semester 2019.

General Information

The course is offered as a commissioned education.

The course is compulsory for a Degree of Master of Science (120 credits) with a specialisation in geomatics. The course is also given for students at the faculty of technology and as a freestanding course.

Language of instruction: English

The course is given in English.

Main field of studies

Geomatics

Physical Geography and Ecosystem
Science

*Depth of study relative to the degree
requirements*

A1N, Second cycle, has only first-cycle
course/s as entry requirements

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Learning outcomes

Knowledge and understanding

To pass the course, the student should be able to:

- explain the theory behind the basic algorithms (for raster, vector and graphs) that is 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,

- describe how geographic data can be stored in a database and how an expanded SQL language can be used to search for geographic data
- thoroughly describe and derive empirical transformations of a surface
- account for spatial data structures and
- account for methods for spatial indexing.

Competence and skills

To pass the course, the student should be able to:

- program basic algorithms that are used in geographic information processing
- structure and solve geometric problems and
- communicate with a database designed for geographic data.

Judgement and approach

To pass the course, the student should be able to:

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

Course content

In the basic courses, the students have got familiar with basic theory of GIS and learnt 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 software. The lectures treat the basic theory to store geographic data in databases and the most important algorithms in a GIS. Exercises are mainly directed towards handling of geographic databases and to program algorithms. The course ends with an individual project.

Course design

The teaching consists of lectures, exercises and project work. Participation in exercises and project work and thereby integrated other teaching is compulsory.

Assessment

Examination consists of a written exam paired with oral and written presentations of project work. For students who have not passed the regular examination an additional examination will be offered in close connection to this.

In consultation with Disability Support Services, the exam may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equal to that of a student without a disability.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

For a Pass on the course, students must have passed the exam, the written assignments and project presentations, and participated in all compulsory components.

Entry requirements

Admission to the course requires relevant Degree of Bachelor in e.g. physical geography or the equivalent including 30 credits in GIS.

Further information

The course may not be included in a degree together with GISN07 Algoritmt teori in GIS, 7.5 credits or NGEN06 Algorithms in geographic information processing, 7.5 credits.

Subcourses in NGEU20, Algorithms in Geographical Information Systems

Applies from H21

2101 Algorithms in Geographical Information Systems, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction

Applies from H19

1901 Algorithms in Geographical Information Systems, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction