Faculty of Science

NGEN21, Geomatics: Applied GIS, 15 credits

Geomatik: Tillämpad GIS, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2021-05-24 and was last revised on 2022-03-01. The revised syllabus applies from 2022-03-01, autumn semester 2022.

General Information

The course is a compulsory course for the Degree of Master (120 credits) in GIS and Remote Sensing within the main field of study geomatics and an elective course for the Degree of Master (120 credits) in Physical Geography and Ecosystem Sciences.

Language of instruction: English

Main field of studies	*Depth of study relative to the degree requirements*
Physical Geography and Ecosystem Science	A1F, Second cycle, has second-cycle course/s as entry requirements
Geomatics	A1F, Second cycle, has second-cycle course/s as entry requirements

Learning outcomes

The aim of the course is that the student, after completion of the course, should have acquired advanced theoretical knowledge and practical skills regarding GIS can be used for applications in earth sciences, environmental sciences, spatial analysis and decision-making. ESRI's software is mainly used for exercises and project work. During the course, the student will also improve their knowledge in GIS programming with Python and other relevant software.

Knowledge and understanding

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

- explain different formats and coordinate systems that are used for geographic data

- give an account of different practical application fields for GIS in earth sciences and environmental sciences
- give an account of different GIS methods and how these can be applied on relevant problems.

Competence and skills

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

- handle geographic data of different types stored in different formats and coordinate systems
- set up systems (batch processes) to streamline the processing of large data quantities
- use advanced GIS functionality in a standard GIS software as well as by means own programming for spatial analysis
- apply advanced analytical methods in GIS to solve real world based environmental problems and to support decision making.

Judgement and approach

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

- discuss and evaluate the selection of geographic data and relevant GIS methods to solve different problems that relate to environmental and spatial planning
- critically evaluate and discuss the reliability of different analytical methods in GIS .

Course content

The course provides a theoretical background for different GIS methods and their application in environmental and spatial planning. The theoretical content of the course includes coordinate systems in two dimensions (x and y) and three dimensions (x, y and z), raster and vector data analysis, digital terrain models, 3D models, spatial interpolation and multi-criteria analysis decision support. The course especially focuses on the use of advanced functionality in ESRI's software and the student's own programming for data management and spatial analysis. The course contains extensive exercises with applications of GIS in different fields, e.g. optimised placement of objects, risk analysis (e.g. landslides and flooding) and decision support for spatial planning. Through realistic case studies, the student develops the ability and proficiencies to solve relevant problems with different GIS-applications.

Course design

The teaching consists of lectures, computer exercises, group assignments and project work. Participation in all components of the course except lectures is compulsory. The lectures provide theoretical knowledge, and the exercises and group assignments connect to theory through realistic applications. The student practises their ability to handle relevant data with advanced GIS methods in each practical exercise. The student is required to write a report for each exercise describing how data have been handled and which analytical methods have been used and to present the results, most often in the form of maps. The course is concluded with a project assignment.

Assessment

Assessment is based on the exam, written assignments during the course and a

project at the end of the course.

Students who do not pass the regular exam will have an additional opportunity to re-sit the exam soon thereafter.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent 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.
To pass the course, the student must have passed the exam, written assignments and project work as well as all other compulsory components.

Grades on written assignments and project work are Fail, Pass or Pass with distinction. The grades for the exam are Fail or Pass.

The final grade is determined by the aggregated results of the different assessed components.

Entry requirements

Entry to the course requires general entry requirements, English 6/B and at least 90 credits in natural sciences or technology, of which at least 15 credits are to be in GIS or the equivalent, such as spatial analysis, cartography, geodesy or remote sensing. Entry to the course also requires NGEN20 Programming for Applications in Geomatics comprising 15 credits or the equivalent.

Subcourses in NGEN21, Geomatics: Applied GIS

Applies from H23

2301 Exam, 2,5 hp
Grading scale: Fail, Pass, Pass with distinction
2302 Project work, 5,0 hp
Grading scale: Fail, Pass, Pass with distinction
2303 Hand-ins, 7,5 hp
Grading scale: Fail, Pass

Applies from H22

2204 Exam, 2,5 hp
Grading scale: Fail, Pass
2205 Project work, 5,0 hp
Grading scale: Fail, Pass, Pass with distinction
2206 Hand-ins, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction