NGEN31, Geomatics: Applied GIS, 15 credits
Geomatik: Tillämpad GIS, 15 högskolepoäng
Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by The Education Board of Faculty of Science on 2024-06-07. The syllabus comes into effect 2024-06-07 and is valid from the autumn semester 2025.

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 study	Specialisation
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 in utilising GIS for diverse applications within earth sciences, environmental sciences, spatial analysis and decision-making. Additionally, students should also gain advanced knowledge about reproducibility that allows them to replicate GIS-based studies. This involves learning the steps and challenges inherent in applying GIS methodologies to research or practical applications. Throughout the course, students will also enhance their proficiency in GIS programming with Python and other relevant software.

Knowledge and understanding

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

- demonstrate understanding of different practical application fields for GIS in earth sciences and environmental sciences,
- explain various GIS methods and how they can be applied to relevant problems,
- define and explain reproducibility and articulate the process of reproducing a piece of GIS-based research or work.

Competence and skills

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

- give an account of different GIS methods and how these can be applied on relevant problems,
- apply advanced GIS functionalities in both standard GIS software and through programming for spatial analysis,
- apply advanced analytical methods in GIS to solve real-world environmental problems and to support decision-making,
- reproduce a piece of research by following a clear methodology and elucidating the challenges involved.

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,
- critically assess the methods employed, including sensitivity analysis to address potential inaccuracies in both data and methodologies.

Course content

The course consists of the following practical and theoretical components:

- Theoretical background on advanced GIS methods and their practical applications
- The concept of "reproducibility" of research and related challenges
- Practical case work and solutions to reproduce research, including aspects of data collection, data management, GIS analysis and programming
- Peer-review and presentation of applied case studies

Course design

The teaching consists of lectures, computer-based exercises, group work and project work. Participation in all parts of the course except lectures is mandatory. The lectures convey theoretical knowledge and exercises and group work are linked to the theory through real-life application examples.

Assessment

Examination is in the form of computer exercises and written assignments during the course and project work at the end of the course.

Students who do not pass an assessment will be offered another opportunity for assessment 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.

Grades

Grading scale includes the grades: Fail, Pass, Pass with distinction
To pass the course, the student must have passed all exercises, hand-ins and the project work.

The grading scale for computer exercises and hand-ins is Fail, Pass, whereas project work is graded according to the scale Fail, Pass, Pass with Distinction.

The final grade is determined by grading the project work.

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.

Further information

The course cannot be credited in the degree together with NGEN21: Applied GIS, 15 credits.

The course is given by the Department of Physical Geography and Ecosystem Science, Lund University.