Faculty of Science

GISA22, GIS: Geographical Information Systems - Advanced Course, 15 credits

GIS: Geografiska informationssystem - avancerad kurs, 15 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2012-05-24 and was last revised on 2025-06-10 by The Education Board of Faculty of Science. The revised syllabus comes into effect 2025-06-10 and is valid from the spring semester 2026.

General information

The course is a compulsory course at the basic level for a Master of Science in geographic information science.

Language of instruction: English

Main field of study	*Specialisation*
Geographical Information Science	G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is to give advanced theoretical and practical knowledge within spatial analysis and geographic information processing.

Knowledge and understanding

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

- explain basic methods and conceptual models of the contents of a geographic database
- explain the principles of transformation between different geodetic reference systems and the choice of map projection
- explain concepts and calculation methods within interpolation and advanced spatial analysis

- account for effects of data accuracy in geographic analysis and modelling
- illustrate advanced applications of GIS in environmental and societal contexts

Competence and skills

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

- build and manage databases with geographic data of different geometric origin and in different format
- carry out interpolation with geographic data
- carry out and present simple statistical evaluations of interpolated spatial data
- carry out and present statistical evaluation methods for classification accuracy
- independently suggest procedure and methods to solve complex geographic issues and to carry out these with GIS
- present results of GIS analysis in writing and as maps for specialists and laymen in the subject
- collect knowledge in the area in an independent way

Judgement and approach

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

- compile, evaluate and discuss choice of analytical methods to solve a given extensive geographic problem
- review and discuss the reliability of analyses with GIS critically
- describe and evaluate using GIS in the society

Course content

The course contains a number of parts that are based on advanced use of existing standard software for database development, analysis and presentation of geographic information. The student develops the ability to structure and solve complex problems.

The course consists of the following parts:

- advanced visualisation
- data collection and format
- database development
- spatial autocorrelation - interpolation
- data quality and sources of errors
- a project involving advanced analysis, database development, report writing, cartographic visualisation, and presentation

Course design

The course is fully online and delivered remotely with no physical meetings. Students are expected to participate under these conditions and to have access to a computer with a reliable internet connection, speakers, a microphone, and a webcam. The department provides information about the technical requirements.

Video meetings may occasionally be held. The course is offered on a full-time or part-time basis, with some flexibility.

The course consists of several subject modules featuring video lectures, literature studies, and practical GIS analysis. Each module concludes with one or more assignments. In addition, the course includes a major project involving database development, analysis, a project report, and a presentation.

Assessment

Examination is based on written assignments submitted throughout the course, which are evaluated on an ongoing basis. The project is presented in the form of a written report and an oral presentation, with significant emphasis placed on the cartographic visualisation of complex geographic information.

Students who do not pass a regular 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
To pass the course, students must receive a passing grade on all assignments related to the subject modules as well as on the project results, including the project report and presentation.

Entry requirements

For admission to the course, general entry requirements are required, English B and GISA21 - Geographical Information Systems - Introduction, 15 credits, or equivilent.

Further information

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

NGEA31 Geographic information systems, introduction, 15 credits

NGEA32 Geographic information systems, advanced course, 15 credits

or other course with equivalent contents.

The course is offered at the Department of Earth and Environmental Sciences, Lund University.