

GIS as a Tool in Environmental Science

GIS som miljövetenskaplig metod

7.5 credits

Single subject course

746G67

Valid from: 2025 Autumn semester

Determined by	Main field of study	
The Quality Board at the Faculty of Arts and Sciences	Environmental Science	
Date determined	Course level	Progressive specialisation
2016-01-29	First cycle	G1F
Revised by	Disciplinary domain	
Chairman of the Course and Programme Syllabus Board at the Faculty of Arts and Sciences	Natural sciences	
Revision date	Subject group	
2024-09-30; 2025-02-12	Environmental Science	
Offered first time	Offered for the last time	
Autumn semester 2025		
Department	Replaced by	
Institutionen för Tema		

Entry requirements

- Scientific Theories and Methods in Environmental Science 15 credits or equivalent.
- Environmental Assessment, Management, and Planning 15 credits or equivalent.
- Biogeochemistry and Environmental Analysis 15 credits or equivalent.
- At least 15 credits must consist of quantitative methods or statistics.
- English corresponding to the level of English in Swedish upper secondary education (Engelska 6).
Exemption from Swedish

Intended learning outcomes

After completion of the course the student should be able to:

- identify relevant geographical information system (GIS) applications in environmental science
- manage geographic data and ArcGIS software
- understand and develop workflow for GIS
- theorise around GIS-based concepts, such as projections and coordinate systems, raster and vector data models, topology and databases as well as representation
- describe principles and demonstrate practical knowledge of satellite image analysis with a focus on land cover and vegetation
- implement, visualize and report a GIS-based project

Course content

The course includes elements that provide the student with basic and expanded knowledge of geographical information systems (GIS) while the student practices in the actual use of GIS, as well as acquiring knowledge of the principles of the benefits and applications of GIS. The course will also make a study visit. The course includes practical exercises in four clusters:

- the collection and management of geographic data
- spatial analysis
- the classification and temporal analysis with a focus on remote sensing
- the visualization of geographic information, as well as an independent minor project in which students are allowed to use their knowledge

Teaching and working methods

In this course lectures, laboratory work, literature seminars and work in the base group will be used. Next to this is a study visit to an environment where GIS is used. Finally, the student will conduct an independent GIS application and conduct self-study. Language of instruction: English

Examination

The course is examined through active participation in the different parts and an independent assignment. To pass the course also requires the submission of reflection statements ahead of base groups meetings and lab reports. Detailed information about the examination can be found in the course's study guide.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

Grades

Three-grade scale, U, G, VG

Other information

Planning and implementation of a course must take its starting point in the wording of the syllabus. The course evaluation included in each course must therefore take up the question how well the course agrees with the syllabus.

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is “Swedish”, the course as a whole could be given in Swedish, or partly, or as a whole, in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is “English”, the course as a whole is taught in English. Examination language is English.
- If teaching language is “Swedish/English”, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English depending on teaching language.