**SYLLABUS**

# GIS in Geoscience 7.5 credits O7021K

## GIS i geovetenskap

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

DECISION DATE
**2021-02-17**

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LULEÅ TEKNISKA UNIVERSITET

# GIS in Geoscience 7.5 credits O7021K

## GIS i geovetenskap

## Second cycle, O7021K

| Education level | Grade scale | Subject | Subject group (SCB) |
| --- | --- | --- | --- |
| Second cycle | G U 3 4 5 | Geovetenskap | Earth Science and Physical Geography |

### Main field of study

Geosciences

# Entry requirements

90 credits in Natural Resourses Technology, Geoscience, Chemistry or Corresponding

# Selection

The selection is based on 30-285 credits

# Course Aim

On completion of the course you should be able to

- Classify and describe the basic elements of Geographic Information Systems (coordinate systems, projections, gridding) and 3D-modelling (triangulation, DEM,…) and their application in geosciences (Intended learning outcome 1).

- Describe and perform a GIS workflow, import and modify geo-spatial data (Intended learning outcome 2).

- Perform independent, digital mapping using GIS software (Intended learning outcome 3).

- Construct simple geological 3D-models using 3D-modelling software (Intended learning outcome 4).

# Contents

This course covers theoretical and practical basics of Geographic Information Systems, covering both traditional techniques and modern technologies.

Theoretic principles cover:
Basics of GIS, map projections and coordinate systems, basic geographic analysis, interpolation and preparation of contour maps and elevation models, Drill hole data in GIS, traditional and digital geographic data capture, photogrammetric surveying, remote sensing, digital image processing, 3D modelling approaches, modelling uncertainties, 3D modelling techniques, 3D model building, 4D modelling basics.

Practicals cover:
- Digital and traditional data acquisition, processing and analysis
- Computer practical in GIS with geological data
- Computer practical with explicit 3D modelling and 3D visualisation of geological data
- Computer practical with implicit 3D modelling and 3D visualisation of geological data

# Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.
This course includes lectures, computer practicals and a written literature seminar. Lectures and computer practicals are organized in an altering order where theoretical principles are covered in the lectures and the learned skills then can be applied in the related computer practicals. The computer practicals are performed in pairs to improve collaboration and enhance problem solving skills. Additionally, a written seminar assignment consists of a literature search within the GIS field, finding a scientific paper of interest and writing a summary of the paper with own comments.

# Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.
The course is assessed through one written exam, 4 graded lab reports and one written seminar assignment.

Intended learning outcome 1 (Classify and describe the basic elements of Geographic Information Systems) is assessed through a written exam (Grading scale G/U) and a written seminar assignment (Grading scale G/U). Intended learning outcomes 2-4 are assessed through 4 written lab reports (one after each lab) that can be handed in in pairs. Grades G/U 3 4 5.

All exams, seminar assignments and lab reports included in the module need to be completed for a course grade.

# Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term “unauthorized aids” refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

# Overlap

The course O7021K is equal to O7010K, KGO009

# Course offered by

Department of Civil, Environmental and Natural Resources Engineering

# Modules

| Code | Description | Grade scale | Cr | Status | From period | Title |
| --- | --- | --- | --- | --- | --- | --- |
| 0004 | GIS laboration | G U 3 4 5 | 5 | Mandatory | A21 | |
| 0005 | Written test | U G# | 1.5 | Mandatory | A21 | |
| 0006 | Literature Seminar | U G# | 1 | Mandatory | A21 | |

# Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students

applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

# Last revised

by Assistant Director of Undergraduate Studies Eva Gunneriusson, Department of Civil, Environmental and Natural Resources Engineering 2021-02-17

# Syllabus established

by Eva Gunneriusson 2012-06-20