



# AL1302 Geoscience and Geotechnical Engineering 7.5 credits

Geovetenskap och geoteknik

This is a translation of the Swedish, legally binding, course syllabus.

## Establishment

Course syllabus for AL1302 valid from Autumn 2019

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

AI1527

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

# Intended learning outcomes

After completing the course students will be able to:

- describe the physical and chemical properties (including knowledge of soil mineralogical composition and classification criteria for soils and rocks)
- explain how previous and ongoing geological and hydrogeological processes impact on landscape development and its long-term sustainable use.
- describe the three-dimensional structure and general stratification of Scandinavian soils
- describe different soil and rock material's technical characteristics and use
- describe the hydrological cycle
- describe the presence of soil- and groundwater and make simple calculations of groundwater and surface water flow
- make general water balance calculations
- interpret hydrological data and make simple statistical calculations based on these
- possess theoretical knowledge of soil mechanics as the basis for the description of the soil material strength and geotechnical applications
- account for different ground improvement methods
- generally interpret existing geological and geotechnical data
- make landslide risk assessment in development planning

## Course contents

The course consists of lectures, exercises, laboratory exercise and a field excursion

The course includes landforms and landscape structures as functions of recent and previous geological processes, position, behavior and physical and chemical (mineralogical) characteristics of soil materials. Particular importance is attached to the structural composition of bedrock and soil layers and changes in soil and rock characteristics in the short and long term. Basic knowledge of the geological conditions in Sweden are and the utilization of earth material. Particular emphasis is given to soil and rock investigation methodology and skills in the interpretation and analysis of spatial data (maps and diagrams). The exercises in this section cover basic knowledge of minerals, soils and rocks as well as interpretation of geological data.

The course covers knowledge of the hydrological cycle and its components and terminology, methods for calculating flows and water balances, basic statistical analysis of hydrological data, basic knowledge of soil water retention characteristics, soil water movement in saturated and unsaturated conditions and the pore water pressure.

Furthermore, the course covers the soil and rock material's technical characteristics, especially the soil mechanical properties. The course also covers methods for ground improvement, execution and interpretation of geotechnical investigations, as well as landslide risk assessment in development planning.

## Course literature

- Andréasson m fl: Geobiosfären, en introduktion, Studentlitteratur
- Bergström: Sveriges hydrologi-grundläggande hydrologiska förhållanden, SMHI
- Övningskompendium
- Exkursionsguide
- Kompendium i geoteknik

## Examination

- ÖVN1 - Exercises, 2.0 credits, grading scale: P, F
- TEN1 - Examination, 5.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.