



# AL1303 Soil and Water 7.5 credits

## Mark och vatten

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

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

## Establishment

Course syllabus for AL1303 valid from Autumn 2020

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

Completed courses:

- AL1302 Geoscience and Geotechnical Engineering
- AL1301 Natural Resources Theory

## 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 plan and carry out field studies for example construction projects and for other uses
- Be able to describe soil and rock based on its structural and tectonic properties
- Be able to assess the technical (physical, mechanical, hydraulic) characteristics of soil and rock as well as its social use
- Be able to describe and discuss the principles and limitations of different methods of determining the soil and rock's technical characteristics (field and laboratory methods)
- Be able to apply and describe the principles of methods of handling spatial variation in soil and rock's technical properties
- Be able to calculate energy resources and energy flows in soil
- Be able to identify and describe processes in the hydrological cycle
- Be able to perform calculations regarding groundwater formation, water flow and water balance in the upper soil layers (unsaturated soil)
- Be able to solve calculations and problem statements dealing with water balance, evapotranspiration, surface drainage, frequency analysis
- Be able to describe different types of aquifers in soil and rock and their hydrogeological properties
- Be able to describe water resources and water utilization in Sweden
- Be able to perform calculation data for groundwater flow and aquifer properties
- Describe methods for examination and evaluation in connection with groundwater prospecting
- Be able to explain the groundwater variation in different hydrogeological environments
- Be able to understand the importance of groundwater for the stability of underground facilities as well as the risks and possible measures for groundwater changes in urban environment

## Course contents

Structural geological and tectonic concepts and terms. Soil and rock's technical characteristics and use. Methods for examining technical and hydraulic properties in soil and rock (field and laboratory methods). Spatial and temporal variation of water and soil related factors as well as how these can be calculated and used in community building. Soil and rock classification methodology, soil field analysis (eg grain size analysis, LA test, pF analysis), equilibrium equation and water retention in unsaturated soil, equations and calculation of temperature, energy flow and energy resources in soil, sampling strategies and spatial statistics. Energy resources and energy flows in land. Energy resources and energy flows in land. The hydrological cycle and its parameters. Basic hydrogeological and hydraulic properties in soil and rock. Unsaturated and saturated flow in soil and rock. Access and presence of soil and surface water in Sweden and its water utilization. Methods for groundwater prospecting. Groundwater variation in time and space and the impact of changed climate. The importance of the water in the urban environment. Groundwater impact at the underground construction.

## Examination

- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Practical assignment, 1.0 credits, grading scale: P, F
- ÖVN2 - Practical assignment, 2.0 credits, grading scale: P, 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.

## 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.