



AE2102 Quantitative Hydrogeology 7.5 credits

Quantitative Hydrogeology

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

Establishment

Course syllabus for AE2102 valid from Autumn 2009

Grading scale

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

Education cycle

Second cycle

Main field of study

The Built Environment

Specific prerequisites

For program students:

EESI (EE-specialisation) AE2101. Environmental dynamics: chemical processes and AE2201. Environmental dynamics: physical processes or equivalent.

WST: AE2202 Dynamics of Environmental Systems and AE2103 Environmental Aquatic Chemistry or equivalent.

Others

Four years of university studies including at least 60 credits in mathematics, physics, chemistry and hydrology

Language of instruction

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

Intended learning outcomes

After passing the course should the student be able to:

- Identify and quantify crucial parameters for contaminant transport in the subsurface
- Establish a conceptual model for a catchment
- Carry out flow and transport modelling of subsurface water for scenario analyses
- Prepare and plan a sampling program for field measurements and sampling
- Carry out and interpret field measurements and experimental data
- Propose solutions for remediation of a contaminated aquifers
- Prepare and present a written report based on field, laboratory and modeling data

Course contents

Lectures in hydrogeology; principles of subsurface flow, groundwater recharge and discharge, theories of solute transport in porous and fractured media, transport processes such as advection, diffusion, dispersion and sorption, hydraulic properties of aquifers and their significance for water and contaminant transport

Lectures in geochemistry; mineral water equilibria in various aquifers, water quality aspects and contamination, major elements in natural waters.

Lecture in contamination and remediation of aquifers, visit to a remediation project

Field exercise at a well-documented site for sampling and measurements, water and soil sampling, conduct test pumping. The field exercise include a written report with evaluation and interpretation of field, laboratory and modelling data presented at a seminar

Computer modelling with GMS on risk assessment of leaching from a landfill site and in the project work

Course literature

Hiscock H.M. 2005. Hydrogeology; principles and practice. Available as E-book at KTH library

Examination

- ÖVN1 - Exercises and Field Exercises, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 1.5 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.

Other requirements for final grade

ÖVN1. Field exercise and project work, 3.0 c. Grade A-F

TEN1. Written examination, 3 c. Grade A-F

LAB1. Computer lab, 1.5 c. Grade A-F

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.