

**SYLLABUS**

# **Geohydrology 7.5 credits**

## **L7019K**

**Geohydrologi**

**Course syllabus admitted: Autumn 2014 Sp 1 - Spring 2016 Sp 4**

**DECISION DATE**  
**2014-02-10**

# Geohydrology 7.5 credits L7019K

## Geohydrologi

### Second cycle, L7019K

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

## Entry requirements

90 credits in geoscience, including the courses O0035K Geology, basic course and L0039K Natural Water Transport Processes.

## Selection

The selection is based on 30-285 credits

## Examiner

Christian Maurice

## Course Aim

After this course will be able to analyse pumping tests in order to determine aquifer characteristics in order to estimate the effects of groundwater extraction. You will also be able to design pumping and observation wells. You will be familiar with a) methods to prospect groundwater b) in what types of rock and soil groundwater access is plentiful c) the laws governing water flux in soils, fractured rock and the unsaturated zone d) problems with and methods used to prevent I) salt water intrusion and II) pollution transport in groundwater III) leakage from landfills e) the structure of and the possibilities and limitations for groundwater models. After the course, the future engineers should be able to work as consultant or in the industry with hydrogeological surveys.

## Contents

Occurrence of groundwater in different types of rock and soil. Fundamental equation of ground water flow in confined and unconfined aquifers. Transient groundwater flow. Flow nets: Vertical and horizontal nets, anisotropical nets and transmissivity determinations from flow nets. Pumping test analysis: Theis's and Cooper-Jacob's methods, aquifers with borders (imaginary wells), recovery data, semi-confined aquifers and aquifers with delayed yield. Practical problems associated with pumping tests. Unsaturated flow: Soil suction curve, pF-concept, techniques to measure unsaturated water content, unsaturated hydraulic conductivity. Sea water intrusion in coastal areas. Landfill hydrology: Water budget considerations to minimise leachate water formation with liners etc. Ground water applications of geophysical methods. Computer exercises: Principles for groundwater models and a demo test of a commercial groundwater. Design of pumping and observation wells. Groundwater flow in rocks.

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Lessons, exercises and computer exercises.

## 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. Written exam (6p) and compulsory individual task to train oral presentation in English (1,5p), including participation to the data modeling. Students who have failed an examination on five occasions will not be allowed further resits.

## Overlap

The course L7019K is equal to KGL015, G7012B

## Literature. Valid from Autumn 2007 Sp 1

Domenico and Schwartz Physical and Chemical Hydrogeology, 1998 or equivalent book.  
Lundberg, A. 2007. Examples in Geohydrology, Div Applied Geology.

## Course offered by

Department of Civil, Environmental and Natural Resources Engineering

## Items/credits

Number	Type	Credits	Grade
0001	Written exam	6	G U 3 4 5
0002	Take-home exam	1.5	U G#

## Last revised

by Eva Gunneriusson 2014-02-10

## Syllabus established

Course plan approved by the Department of Chemical Engineering and Geosciences 2007-02-28.