



FAF3801 Hydrological Transport Processes 7.5 credits

Hydrologiska transportprocesser

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

Establishment

The course syllabus is valid from Spring 2019 according to the Head of school decision A 2018-0848. Date of decision: 2018-05-02

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Essential pre-requisites include algebra, calculus, differential equations, programming/Numerical analysis and Fluid Mechanics. It is advantageous to have a basic knowledge in transform methods, quantitative Hydrology, Soil Science and Groundwater.

Language of instruction

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

Intended learning outcomes

That the course participants develop an understanding of the physics and mathematical formulations of transport processes in hydrology and its application to water resources engineering in rivers, groundwater and other aquatic environments. The participant should particularly develop an understanding on mathematical coupling or hydromechanical problems with chemical reactions (e.g. spreading of solute pollutants) and geomechanics (e.g. erosion problems) in natural environments and the most well known transport phenomena and solution techniques.

Course contents

Transport equations for mass, heat and momentum in natural environments using differential as well as integral (compartmental) formulations. The theory is applied to selected problems on contaminant transport and erosion. Multi-phase kinematic problems in geochemistry (pollution problems) and geomechanics (erosion problems). Various transport phenomena such as turbulent diffusion, dispersion phenomena, sorption retention and non-linear reaction isotherms. Averaging in geoscience and heterogeneous systems including geostatistics and stochastic partial differential equations. Selected solution techniques for the advective-diffusive equation.

Course literature

"Transport processes for environmental scientists and Engineers." Mark M. Clark. John Wiley. New York (Eds. 1996 or 2009)

Examination

- INL1 - Homework, 7.5 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.

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

Compulsory assignments.

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.