



AE1603 Fluid Mechanics for Energy and Built Environment 5.0 credits

Strömningsmekanik för energi och miljö

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 AE1603 valid from Autumn 2012

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

SG1102 Mekanik, mindre kurs; Mathematics 20 cr.

Language of instruction

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

Intended learning outcomes

After the course the student should be able to:

- Describe and explain fundamental concepts and phenomena in fluid mechanics and derive some fundamental equations.
- Solve problems dealing with hydrostatic pressure, steady and some types of unsteady flow in closed conduits and open channels, forces caused by flowing water, and groundwater flow.

Course contents

Properties of fluids.

Hydrostatic pressure towards plane and curved surfaces, Archimedes' principle.

The conservation laws: the continuity, energy and momentum equations.

Pipe flow: friction losses, local losses, systems with pipes and reservoirs, pump design.

Open channel flow: uniform and non-uniform flow, sub- and supercritical flow, critical depth, the hydraulic jump, canal delivery problems.

Forces by flowing water on pipe bends and manifolds calculated with the momentum and moment of momentum equations.

Groundwater flow: Darcy's law, potential flow, Navier-Stokes equations (brief).

Flow through openings, flow measurement.

Course literature

Hägström, S. Hydraulik för samhällsbyggnad. Liber (2009)

Bergh, H. Exempelsamling i strömningsmekanik. Mark- och vattenteknik, KTH (2012)

Examination

- TEN1 - Written Exam, 3.5 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Exercises, 1.5 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.

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.