



AE1601 Fluid Mechanics for Architecture and Built Environment 7.5 credits

Strömningsmekanik för samhällsbyggnad

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

Establishment

Course syllabus for AE1601 valid from Autumn 2010

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

S1010 Physics for the built environment and SG1107 Mechanics or corresponding courses.

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 within fluid mechanics and technical thermodynamics and derive some fundamental equations

Solve problems regarding hydrostatics, steady and some types of unsteady flow in pipes and open channels, forces caused by fluids in motion and ground water flow

Solve problems regarding applications of the energy equation incl fluid machines and heat transfer of fluid flow

Course contents

Properties of fluids

Hydrostatic thrust on 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 - pipeline systems

Open channel flow: Manning's equation, uniform and non uniform flow, subcritical and supercritical flow, critical depth, hydraulic jump, canal delivery

Flow measurement

Ground water flow: Darcy's law, potential theory, flow nets, Navier-Stokes equations (introduction)

Basic concepts in applied thermodynamics and refrigeration cycles incl heat pumps

Heat transfer for fluid flow in pipes/ducts and heat exchangers

Course literature

Hägström, S: Hydraulik för samhällsbyggnad, Liber. In Swedish

Bergh, H: Exempelsamling i strömningsmekanik, KTH. In Swedish

Kompendium i Teknisk termodynamik, särtryck för Installationsteknik, KTH. In Swedish

Examination

- ÖVN1 - Exercises, 1.5 credits, grading scale: P, F
- TEN2 - Examination, 2.2 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 3.8 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.

Allowable aids at examination:

Formulas in fluid mechanics (In Swedish)

Compendium in technical thermodynamics (In Swedish)

Calculator

Other requirements for final grade

Approved written examination (TEN1; 3,8 cr and TEN2; 2,2 cr) and approved assignment and laboratory course (ÖVN1;5 cr)

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.