



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.

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

Establishment

Course syllabus for AE1601 valid from Autumn 2017

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Mathematics 20hp and SG1117 Engineering Mechanics or corresponding course.

Language of instruction

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

Intended learning outcomes

Describe and explain fundamental concepts and phenomena within fluid mechanics and technical thermodynamics and derive some fundamental equations.

Solve problems regarding hydrostatics, steady flow in pipes and open channels, forces caused by fluids in motion.

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

Course contents

Fluids: fundamental concepts

Fluid properties, Pressure, Surface tension, Viscosity.

Fluids at rest: Hydrostatics

Pascal law, Stevino law, Manometers, Force on submerged plane surface, Force on submerged curved surface.

Fluids in motion: Dynamics

The continuity equation, The Euler's equation, The Bernoulli Equation, The momentum equation.

Fluids in conduits: Pressure flow

Laminar and turbulent flows in pipes, Reynolds number, Darcy-Weisbach equation, Moody chart (distributed head losses), Minor (local) head losses, Flow/machine energy exchange.

Fluids in rivers: open channel flow

Uniform flow, Non uniform flow, Specific energy, Flow regimes, Hydraulic jump, Water surface profiles.

Basic concepts in applied thermodynamics and refrigeration cycles include heat pumps.

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

Course literature

Introduction to fluidmechanics, Fox and McDonald's, Wiley, 8th edition

Tillämpad termodynamik Ingvar Ekroth, Eric Granryd. Studentlitteratur AB

Lecture material and exercises in fluidmechanics will be provided.

Examination

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

Allowable aids at examination:

Formulas in fluid mechanics will be provided.

Compendium in Applied 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.