



# 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.

## Establishment

Course syllabus for AE1603 valid from Autumn 2017

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

SG1102 Mechanics, Smaller Course ; Mathematics 20 cr.

## 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.

## 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.

## Course literature

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

Lecture material and exercises in fluidmechanics will be provided.

## Examination

- ÖVN1 - Exercises, 1.5 credits, grading scale: P, F
- TEN1 - Written Exam, 3.5 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 will be provided.

Calculator

## 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.