



# 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

The official course syllabus is valid from Autumn 2024. The decision is made by Director of First and Second Cycle Education: A-2024-0696. Date: 2024-03-22

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

Basic knowledge of mathematics and physics corresponding to the content of the courses:

SF1625 Calculus in One Variable (7.5 credits)

SF1626 Calculus in Several Variables (7.5 credits)

and a minimum of 3 credits completed in course SG1102 Mechanics, Smaller Course (6 credits)

## 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.

## 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.

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.