



SG1217 Fluid Mechanics, Basic Course 6.0 credits

Strömningsmekanik, grundkurs

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

Establishment

The course syllabus is valid from Spring 2025 according to the school principal's decision: S-2024-1589 Decision date: 2024-10-14

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Completed course in Basic Mechanics (Mechanics I), at least 9 credits.

Language of instruction

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

Intended learning outcomes

After studying this course the student should be able to:

- apply the conservation laws for mass and momentum in various technical flow problems in order to analyze the interaction of forces between solid bodies and flowing/stationary fluids,
- identify and apply mathematical models for estimating fluid mechanical quantities,
- conduct a comparative analysis between the results of a mathematical model and the corresponding empirical data.

Course contents

Hydrostatics. The kinematics of currents. Streamline and particle path. Dimensional analysis. Frictionless incompressible flow. Bernoulli's equation. The control volume formulation of the continuity and momentum equation. Stream function for two-dimensional flow. Irrotational flow and velocity potential. Viscous flow: laminar and turbulent flow in channels and boundary layers, separation.

Laboratory exercises: Two compulsory laboratory exercises, which are carried out in groups of four students. Each laboratory session begins with a brief oral test to check that all group members are prepared. The laboratory report can be completed at the laboratory session. In addition to the teaching, some demonstrations are carried out in the fluid physics laboratory illustrating various flow phenomena.

Project assignment: Mandatory project assignment on the flow phenomena around a two-dimensional wing profile, especially with regard to the determination of the lifting force. The labs are an integral part of this project assignment.

Examination

- PRO2 - Project, 2.5 credits, grading scale: P, F
- TEN2 - Examination, 0.5 credits, grading scale: P, F
- KON2 - Control Test, 1.5 credits, grading scale: P, F
- KON1 - Control Test, 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.

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

The examiner, in consultation with the KTH coordinator for disability (Funka), decides on any adapted examination for students with documented, permanent disability. The examiner may allow another examination form 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.