



SG2214 Fluid Mechanics 7.5 credits

Strömningsmekanik

Course syllabus for SG2214 valid from Autumn 12

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

Grading scale: A, B, C, D, E, FX, F

Education cycle: Second cycle

Main field of study: Mechanical Engineering

Intended learning outcomes

- The student should be able to formulate mathematical models of fluid mechanical phenomena, and make relevant approximations.
- The student should be able to apply these models (numerically or theoretically) and interpret the result.
- The student should get a basic preparation for the future ability as a master of engineering to work with computational fluid mechanics in technical applications.

Course main content

The student should be able to

- derive the Navier-Stokes equations and explain the meaning of its terms, including the stress and deformation rate tensors
- describe the method of transferring from compressible to incompressible equations
- compute the flow field for a number of so called exact solutions
- derive the vorticity equation and give a physical explanation of its terms
- use the concepts of stream function, velocity potential and apply the Bernoulli equation
- discuss the principles of and derive the boundary layer approximation of the Navier-Stokes equations, and to give self similar solutions of these equations including simple thermal boundary layers
- describe the phenomena of separation of streamlines.
- describe simple phenomena in turbulence, as e.g. turbulent stresses.
- derive the Reynolds averaged equations
- suggest methods to measure the velocity in a flowing medium

Disposition

Lectures: 28h

Recitations: 28h

Tutorials: 4h

Laboration: 3h

Language of instruction

Language of instruction is specified in the course offering information in the course and programme directory.

Eligibility

Compulsory courses of the main programmes at F or T. Alternatively, compulsory courses at B or M and in addition SG1217 or SG1220.

Literature

Kundu & Cohen, Fluid Mechanics, Academic Press.

Additional course material may be available via course home page.

Examination

- INL1 - Assignments, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Requirements for final grade

Homework assignment (INL1; 3 cr)

Exam (TEN1; 4,5 cr.)