SD2611 Aerodynamic Design of Aircraft 9.0 credits

Aerodynamisk utformning av flygplan

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 SD2611 valid from Autumn 2011

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Language of instruction

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

Intended learning outcomes

The **overall objectives** of the course are that you should be able to:

- **motivate** different mathematical models of the aerodynamic forces acting on aircraft,
- **use** modern CFD methods to compute pressure distributions and aerodynamic forces acting on aircraft, both at low and high speed,
- **compute** the influence of boundary layers, separated flow, stall, wave drag and shock stall for an aircraft wing,
- **apply** CFD to **perform** aerodynamic design of aircraft, and **explain** the obtained results.

Course contents

The basic theory used in CFD methods is dealt with during lectures; models for viscous flow, inviscous flow coupled with boundary layer solvers, compressible and incompressible flow. Properties of the governing partial equations are treated, as well as numerical methods for solving these.

The theory is then applied in a number of computer labs where you learn how to use CFD software (in particular the Swedish national code EDGE). The CFD codes are used to solve a series of applied problems in aerodynamics. The labs are performed in cooperation with others. Guest lectures give insight in industrial applications of CFD, in particular the interaction between aerodynamics and design of aircraft.

Specific prerequisites

SD2601 Fundamentals of Flight and SD2800 Experimental Aerodynamics or permission from the coordinator.

Course literature

Rizzi, A., **Computational Aerodynamics in Aircraft Design.** Lecture Notes, KTH Aeronautical and Vehicle Engineering.

Examination

- INL1 - Assignments, 3.0 credits, grading scale: P, F
- LAB1 - Laboratory Work, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 3.0 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.

Other requirements for final grade

Laboratory work (LAB1; 4 university credits).
Hand-in assignments (INL1; 3 university credits).
Written exam (TEN1; 2 university credits).

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.