SD2810 Aeroelasticity 9.0 credits

Aeroelasticitet

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 SD2810 valid from Autumn 2008

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

SD2411 Lightweight Structures and FEM, and SD2805 Flight Mechanics or permission from the coordinator.

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:

- **explain** how the aeroelastic phenomena flutter, divergence and aileron reversal arise and how they affect aircraft performance,
- **formulate** aeroelastic equations of motion and use therse to **derive** fundamental relations for aeroelastic analysis,
- **perform** a preliminary aeroelastic analysis of a slender wing structure in low-speed airflow, and
- **explain** under what circumstances an aeroelastic analysis can be expected to produce useful results.

Besides from the aims related to your knowledge and skills in aeroelasticity, the course also aims at improving your ability to

- learn with and from colleagues having a different background than yourself,
- approach and develop valid solution strategies to complex engineering problems,
- present your results and conclusions effectively, and
- review and give feedback on work performed by a colleague.

Course contents

The course is based on a problem setting where an elastic wind-tunnel model is utilized for learning of aeroelastic phenomena and development of aeroelastic analysis. Emphasis is put on the analysis of aeroelastic deformation, divergence, flutter and control surface efficiency, based on finite element analysis and potential flow methods. In order to create a natural and creative learning environment, the course is based on a peer learning approach. You will therefore belong to a student team that meets regularly to discuss around selected parts of the literature, and decide on topics that need further attention in the course. The technical work mainly consists of the development of an aeroelastic analysis in Matlab that should be compared with experimental results from wind tunnel testing. Finally, you are challenged to perform and document a preliminary aeroelastic analysis of an airframe.

Course literature

Borglund D. and Eller D., Aeroelasticity of Slender Wing Structures in Low-Speed Airflow. Lecture Notes, KTH Aeronautical & Vehicle Engineering..

Examination

- LAB1 - Laboratory Work, 3.0 credits, grading scale: P, F
- PRO1 - Project, 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; 3 university credits)
Oral exam (TEN1; 3 university credits)
Project assignment (PRO1; 3 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.