SD2805 Flight Mechanics 9.0 credits

Flygmekanik

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 SD2805 valid from Autumn 2007

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

SD2600 Aircraft Performance Analysis and preferably SD2800 Experimental Aerodynamics 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:

- **formulate** equations of motion for an aircraft in atmospheric flight,
- **motivate** the assumptions made to simplify a flight mechanics problem,
- **analyze** equilibrium and stability for an aircraft,
- **explain** the basic modes of motion and related mechanisms of an aircraft,
- **design** a basic control system using simplified equations of motion,
- **perform** simple trajectory calculations by integrating the equations of motion in time,
- **present** your results in a well written report.

Course contents

The course is based on lectures, the contents of which are applied in wind-tunnel testing and during computer labs. The exercises are performed in groups but the results must be presented individually. The first assignment in the course is a short introduction to Matlab, since the main part of the analysis is performed in this program. Here you can build your own "toolbox" to use in the successive assignments.

Parallel to the lectures you apply the theory in different labs where you also have to use your knowledge from earlier courses in aeronautics, solid mechanics, numerical methods and linear algebra. The course treats general equations of motion for aerial vehicles, models of aircraft and the atmosphere, and conditions for equilibrium. Thereafter linearization and solution of equations of motion. This forms the basis for analysis of trajectories, modes of motion as well as control analysis and synthesis. The course also gives an orientation on sensors and actuators.

Course literature

Etkin, B. and Reid, L. D. Dynamics of Atmospheric Flight: Stability and Control. John Wiley & Sons, 1996.

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)
Written 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.