SD2816 Rocket Science 7.5 credits

Rocket Science

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

Establishment

Course syllabus for SD2816 valid from Autumn 2012

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

The course is primarily intended for students in the Aerospace Engineering program (including exchange students). For as long as room is available, other students are also welcome to participate.

Language of instruction

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

Intended learning outcomes

The overall learning objectives of the course are that you should:

- on the basic level, develop an adequate conceptual understanding of the most fundamental principles and mathematical models of spaceflight dynamics, mainly related to rocket performance and impulsive orbit transfer,
- on the advanced level, be able to derive and explain more detailed mathematical models of spaceflight dynamics, mainly related to launcher trajectories, two-body orbital mechanics, relative orbital motion and low-thrust orbit transfer,
- in a collaborative setting, be able to plan a geocentric space mission on a conceptual level, including elements such as determination of suitable trajectories, the number of stages required, and the approximate energy and mass budget,
- in a collaborative setting, improve your ability to write an engineering paper, to prepare and perform an oral presentation, and to give constructive feedback on such work, and
- improve your ability to work and learn in a culturally mixed group, and to identify your own strengths and areas of personal development.

Course contents

In order to create a natural and creative learning environment, a peer learning approach is used in the course. You will therefore belong to a student team that meets on a regular basis to discuss around various topics and to perform project work. You will treat topics like rocket propulsion and performance, launcher trajectory analysis, two-body orbital mechanics, geocentric orbits and trajectories, and impulsive and low-thrust orbit transfers. The technical work in the course mainly consists of a project assignment. The ambition is to offer a challenge that is related to a topic of current interest in the space community. This means that the focus of the course can differ somewhat from one year to the next.

Course literature

William E. Wiesel, Spaceflight Dynamics, 3rd ed., Aphelion Press, 2010.

Boken finns att köpa i KTH Farkost och flygs studentexpedition, Teknikringen 8, 3 tr

Examination

- PROA - Project, 4.5 credits, grading scale: P, F
- TENA - 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.

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

Other requirements for final grade

Project assignment (PROA; 4.5 university credits)
Examination (TEN1; 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.