

SYLLABUS

Spacecraft Systems 7.5 credits R7028R

Rymdfarkostens system

Course syllabus admitted: Autumn 2024 Sp 1 - Present

**DECISION DATE
2024-02-15**

Spacecraft Systems 7.5 credits R7028R

Rymdfarkostens system

Second cycle, R7028R

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Rymdteknik	Space Technology

Main field of study

Space Technology

Entry requirements

The applicant shall have competence equivalent to the degree from a basic engineering program or a Bachelor's degree with a minimum of 180 credits in the areas of space technology, aerospace, aeronautics, mechatronics, space physics, physics, electronics, mechanics, computer science or equivalent.

Previous course work at university level must include electronics or mechanics, and a minimum of 22.5 credits in mathematics at university level is required. Good knowledge in English equivalent to English 6..

Selection

The selection is based on 30-285 credits

Course Aim

The goal of the course is to provide basic knowledge of the fundamental systems of a spacecraft bus - its relations with each other, its interdependencies, and its influences on the overall spacecraft design.

After the successful completion of the course, the student shall be able to:

- Show a common understanding of all spacecraft systems
- Perform a baseline design of a spacecraft
- Demonstrate the ability to define all elements of the ground, launch and space segment of a mission and their relations
- Show the understanding of principle steps of a mission design process

Contents

- Space mission design and project phases
- Space systems architecture: ground, launch and space segments.
- Main categories of space missions (Earth observation, telecommunication, navigation, science and exploration) and their main requirements.
- Orbit geometry: orbit parameters, types of orbits, coverage, visibility, ground track.
- Payload selection and sizing.
- Spacecraft requirements supporting the payload.
- Spacecraft bus systems: power system, thermal control system, attitude control system, orbit control systems, command and on-board data handling, communication, structure and mechanisms.
- Budgets and estimates: Mass, power, communication link, and more.
- Launch system interface, qualification, and ground testing.
- Space systems development and management methodologies.

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Lectures, homework assignments, and tutorials.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Examination is done via homework assignments. In order to pass the course it is required that all compulsory moments are completed satisfactory. The final grade given for the course reflects the results obtained during the course compulsory moments.

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0005	Assignment report	G U 3 4 5	7.5	Mandatory	A24	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Robert Brännström, HUL at the Department of Computer Science, Electrical and Space Engineering. 2024-02-15

Syllabus established

by Jonny Johansson, HUL SRT 2019-02-15