

SYLLABUS

Space Instruments 7.5 credits R7013R

Rymdinstrument

Course syllabus admitted: Spring 2024 Sp 3 - Present

**DECISION DATE
2023-02-15**

Space Instruments 7.5 credits R7013R

Rymdinstrument

Second cycle, R7013R

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Rymd- och atmosfärsvetenskap	Space Technology

Main field of study

Space Technology

Entry requirements

Knowledge in the area of plasma physics, corresponding to e.g. F7010R - Plasma physics 7.5 credits, or space physics, e.g. R7017R - Space Physics 7.5 credits or R7004R - Spacecraft Environment Interactions 7.5 credits.

Good knowledge in English equivalent to English 6.

Selection

The selection is based on 30-285 credits

Course Aim

After completing the course, the student shall be able to explain and evaluate the most important types of space instruments in order to independently motivate and propose interplanetary space experiments.

Knowledge and understanding

The student shall acquire knowledge about space instrument physical principles, technological design and technical requirements for platforms. This is shown by the student's capability to explain and categorise various physical processes which are important for instrument design, to evaluate the technical solutions which are critical in relation to the problem as well as to implement these instruments for planning and performance of complex scientific space experiments.

Competence and skills

The student shall show capability to critically and independently formulate the scientific problems, perform technical calculations and analysis of space instruments within the given time frame. This is realised via home assignments and examination. The student shall be able to analyse, motivate, plan and validate scientific experiments with these instrument during the project work. The student shall be able to critically select and evaluate relevant scientific and technical information within the subject via the literature survey and project evaluation among each other according to the procedures of the European Space Agency (ESA). Ability and skills to present own results and arguments during the international events are trained and evaluated via report writing and oral presentation in English. The student shall demonstrate social skills and be able to effectively work in a group during the project.

Judgement and approach

The student shall have an insight into technical possibilities and limits as well as human responsibility for the way of their using. This is shown via evaluation of the relevant technological and ethic aspects with a focus on sustainable development and the Swedish national equality goals. Student will have deep insight into cutting-edge research and innovative development of space instruments and take the responsibility for own knowledge progress.

Contents

The course contains and deals with basic principles for measurement of magnetic and electric fields as well as waves in space, measurements of particles in space, measurements done by the satellite based telescopes, techniques and approaches for investigation of planetary surfaces and atmospheres, selective results from the interplanetary missions and scientific management of the space instrument projects.

The course covers current research and development in space science and technology with a focus on sustainable development as well as concept like equality and gender mainstreaming.

Realization

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

The course includes teaching and learning activities such as lectures, project work and assignments that consider both technical aspects as well as training in experimental techniques and technical report writing in English.

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. The course is assessed through a written examination, written assignments and a project work. In order to pass the course it is required that all compulsory tasks are completed satisfactory with a grade "Pass".

The final grade for the course reflects the results obtained for all compulsory tasks and is given after all compulsory tasks are approved. The grading scale for the course is 3, 4, 5.

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
0009	Assignment	U G#	2	Mandatory	A15	
0010	Project work	U G#	3	Mandatory	A15	
0011	Written exam	G U 3 4 5	2.5	Mandatory	A21	

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 2023-02-15

Syllabus established

by the Dept of Space Scienc 2010-10-15