

**SYLLABUS**

# **Space Physics 7.5 credits**

## **R7017R**

**Rymdfysik**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

DECISION DATE  
**2023-02-15**

# Space Physics 7.5 credits R7017R

## Rymdfysik

### Second cycle, R7017R

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

Basic courses in mathematics like M0047M Differential calculus, M0048M Linear Algebra and Calculus, M0049M Linear Algebra and Differential Equations and M0055M Multivariable calculus. Basic courses in physics like F0004T Physics 1, F0005T Physics 2, F0006T Physics 3 and F0007T Electromagnetic field theory. Good knowledge in English equivalent to English 6.

## Selection

The selection is based on 30-285 credits

## Course Aim

The student shall acquire knowledge about space physics relevant to the solar system. After finishing the course, the students shall be able to

- Describe the structure and dynamics of the Earth's magnetosphere as well as differences between the magnetized and non-magnetised planets,
- Recognize the processes behind the Aurora, Demonstrate skills to interpret physical processes on the basis of satellite data,
- Show capability to critically and independently formulate the problems and perform technical calculations/estimations within the given time frame.
- Show the ability and skills to present own results and judgements via report writing in English.

After the project work, the student shall be able to

- utilize their knowledge for judgement and/or analysis of space physical phenomena,
- critically select and evaluate relevant scientific and technical information within the subject via literature survey/studies of scientific papers
- demonstrate social skills needed to effectively work in a group during the project work.

## Contents

The course starts with the history of space plasma physics followed by introduction to the motion of charged particles in the electro-magnetic fields. Included in the course is solar and solar wind physics as well as the structure and dynamics of the magnetosphere of the Earth. Space environments around other planets is discussed as well as differences between non-magnetized and magnetized planets. The ionosphere and the processes responsible for auroral phenomena is described. Wave phenomena in the magnetosphere and space weather. During the project, the students study and interpret scientific papers and relate them to what they have learnt in the course, and/or analyse measurements from particle and field satellite data.

## Realization

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

Lectures, assignments, and project.

Parts of the lectures may be implemented using hybrid/blended education methods (online).

## 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.

Written exam and assignment and project. The project is examined through a report. To pass the entire course with a final grade, it is required that all exams and compulsory parts are passed.

## 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
0003	Assignment	U G#	1.5	Mandatory	A10	
0004	Written exam	G U 3 4 5	4	Mandatory	A21	
0005	Project work	U G#	2	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 Department of Space Science 2010-02-23