

**SYLLABUS**

# **Space Exploration for beginners 7.5 credits R0009R**

**Rymdutforskning för nybörjare**

**Course syllabus admitted: Spring 2024 Sp 3 - Present**

**DECISION DATE  
2023-02-15**

# Space Exploration for beginners 7.5 credits R0009R

## Rymdutforskning för nybörjare

### First cycle, R0009R

<b>Education level</b>	<b>Grade scale</b>	<b>Subject</b>	<b>Subject group (SCB)</b>
First cycle	U G#	Rymdteknik	Space Technology

## Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language + Swedish upper secondary school courses English 6, Mathematics 3b or 3c, Mathematics C.

## Selection

The selection is based on final school grades or Swedish Scholastic Aptitude Test.

## Course Aim

On successful completion of the course, you should be able to:

1. describe the current state, origin and evolution of bodies in the solar system and beyond;
2. understand the principles of spaceflight and the main elements of space missions (in example launch vehicles, satellites and planetary probes, ground segment)
3. explain how space missions can be used to explore and characterise bodies in the solar system;
4. source, analyse and visualise space mission data;
5. know about spacecraft and its subsystems as well as technologies and mission concepts and designs to conduct space exploration

# Contents

Contents:

Exploring the solar system Airless bodies Components of a space mission Atmospheres, ionospheres, magnetospheres Case study: Exploring Mars Gas giants & icy moons

Databases of planetary data Case study: Exploring Titan

Planetary exploration in the lab

Humans in space

Are we alone in the Universe?

History of space exploration

Principles for spaceflight

Elements of space missions

Mission designs for space exploration – examples: Moon and Mars

Systems and Elements of a spacecraft (satellites as well as planetary probes)

Propulsion systems and launch vehicles

Scientific payloads and instruments

Challenges of human and robotic space exploration

Ground segment for testing and operations

Future of space exploration – examples: collaborative and commercial space activities

## Realization

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

-Lectures

-Literature seminars

-Student projects

-Student assignments

## 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.

Individual assignments:

one on planetary landing site selection,

one on analysis of space mission data.

one on space mission design

An essay to showcase the understanding of the course content.

## 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.

## Remarks

The course cannot be read together with R0007R within a program.

## Overlap

The course R0009R is equal to R0007R

## Course offered by

Department of Computer Science, Electrical and Space Engineering

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Assignment report	U G#	6	Mandatory	S24	
0002	Essay	U G#	1.5	Mandatory	S24	

## 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.

## Syllabus established

by Robert Brännström 2023-02-15