

SYLLABUS

Plasma physics 7.5 credits

F7010R

Plasmafysik

Course syllabus admitted: Spring 2024 Sp 3 - Present

DECISION DATE
2023-02-15

Plasma physics 7.5 credits F7010R

Plasmafysik

Second cycle, F7010R

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

Entry requirements

M0029M Calculus 7.5 credits, M0030M Linear Algebra and Calculus 7.5 credits, M0031M Linear Algebra and Differential Equations 7.5 credits, M0032M Functions of Several Variables and Computer Tools 7.5 credits, M0018M Linear analysis 7.5 credits and F0007T Electromagnetic field theory 7.5 credits, or corresponding knowledges.

Good knowledge in English equivalent to English 6.

Selection

The selection is based on 30-285 credits

Course Aim

After completing the course, you can:

Knowledge and understanding

- Describe the basics of the plasma condition.
- Demonstrate an understanding of the mathematical methods that can be applied to solve problems in plasma physics.
- Demonstrate knowledge of simplifications and approximations that are common in plasma physics

Skill and ability

- Describe and define a plasma
- Analyze the motion of charged particles in homogeneous and inhomogeneous electric and magnetic fields.
- Define the concept of adiabatic invariant and analyze waves in cold plasma.
- Analyze and model plasma as a fluid (MHD).
- Analyze and describe instabilities in plasma.

Judgment and attitude

- Describe the role of plasma physics in space science and space technology.
- Demonstrate knowledge of today's challenges in plasma physics.
- Demonstrate increased experience in engineering assessments and analytical methods, as well as identification and formulation of problems.

Contents

Definition of plasma. Occurrence of plasmas. Charged particle motion. Wave propagation in plasma. Classification of plasma. Plasma theories. Plasma instabilities.

Realization

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

The teaching consists of lectures, problem solving, and homework. The lectures provide theoretical background, motivations, explanations and examples of applications of the current course section. In problem solving, methodology and working methods for solving problems are demonstrated.

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 examined with a written exam and laboratory work. All examination parts must be completed for the final grade on the course.

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

Advanced level. The course is a prerequisite for advanced study of plasma in space like in the course F7001R Space Plasma Physics.

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0003	Laboratory work	U G#	1.5	Mandatory	S12	
0004	Written exam	G U 3 4 5	6	Mandatory	S22	

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 Huvudansvarig utbildningsledare SRT, Jonny Johansson 2011-02-07