

SYLLABUS

Physics 3 7.5 credits

F0006T

Fysik 3

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2022-02-14

Physics 3 7.5 credits F0006T

Fysik 3

First cycle, F0006T

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Fysik	Physics

Main field of study

Engineering Physics and Electrical Engineering

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 and You are expected to have knowledge in statics and simple dynamics as well as differentiation and derivation. This can, for example, be obtained in F0004T Physics 1, 7,5 hp, and M0047M Calculus, 7,5 hp.

Selection

The selection is based on 1-165 credits.

Course Aim

After completing the course, you can

1. Knowledge and understanding

- explain and illustrate, for simple, two-dimensional, rotating bodies, the concepts: work, energy, momentum, angular momentum, moment of inertia and center of mass and the corresponding dynamics
- explain and illustrate the concepts: time dilation, length contraction, relativistic Doppler shift, radioactive radiation and nuclear decay.

2. Skills and abilities

- make free-body diagrams and solve 2D dynamical problems for particles and simple rigid bodies in

1. simple rotation,
2. physical pendulum motion,
3. satellite movement,
4. and non-constant acceleration

- calculate the position of the center of mass for arbitrary 2D bodies
- apply the law of conservation of mechanical energy on systems with rotating parts
- solve simple problems in special relativity
- calculate the energies in radioactive decay and nuclear reactions
- present scientific results in a structured way
- present your solutions in a comprehensible way

3. Assessment and attitude

- make simple group work in a group with different composition
- discuss the nuclear question with regards to the technology, sustainability and environment
- superficially discuss and illustrate gender equality

Contents

Modern Physics:

- special relativity
- nuclear- and particle physics
- radioactivity
- risks of radiation exposure when using radioactive isotopes in technology and medicine
- astrophysics and cosmology

Mechanics:

- motion under non-constant acceleration
- polar coordinates
- 2D collisions, coefficient of restitution
- gravitation
- periodic motion
- movement of center of mass
- inertia
- kinetics and kinematics of rigid bodies (translation and rotation)
- dynamic momentum and forces in bearings
- moment of inertia and dynamics of rigid bodies

Realization

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

Lectures and compulsory laboratory work. The lectures contain overview of theory, demonstrations and problem solving.

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 at the end of the course and compulsory assignments. Two laboratory exercises with written reports. Alternative forms of examination may occur. If a student has not been under proper surveillance, or if the examiner has another factual ground to doubt that the student has the required knowledge, a complementary examination may be required

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

This course cannot be included in a study program in combination with courses MTF008, MTF009, MTF429, MTF098, F0060T, W0012T, Completion course Mechanics or Completion course Modern Physics.

Overlap

The course F0006T is equal to F0066T, F0065T, MTF098, F0060T, W0012T, MTF009

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0003	Laboratory, Mechanics	U G#	0.5	Mandatory	S16	
0004	Laboratory, Modern Physics	U G#	1	Mandatory	S16	
0006	Assignment report	U G#	3	Mandatory	A21	
0007	Written exam	G U 3 4 5	3	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.

See also

<https://ltu.instructure.com/courses/9273>

Last revised

by Niklas Lehto, Programme Director 2022-02-14

Syllabus established

by Department of Applied Physics and Mechanical Engineering 2002-05-03