

Physics 1 for Foundation Year

Academic preparatory

12 fup

Fysik 1 för basår

BFN101

Valid from: 2020 Spring semester

Determined by

Board of Studies for Chemistry, Biology
and Biotechnology

Date determined

2019-09-23

Main field of study

No main field of study

Course level

Academic preparatory

Course offered for

- Foundation Year in Science and Technology

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

See admission requirements för the Foundation Year at Linköpings universitet.

Intended learning outcomes

The aim of the course is to provide a basic knowledge of physics, adapted for continued university studies within the areas of technology and natural science. The course provides qualifications equivalent to "Fysik 1a".

After the course, the student should be able to:

- Solve problems and explain phenomena in the areas mechanics theory of heat, electricity and modern physics on a basic level.
- Use physical concepts and models in a mathematical form, and calculate physical quantities.
- Perform physical experiments and analyze the results
- Develop a simple physical model by testing hypotheses

Course content

- Foundations and methods of physics: Physical models, interaction theory-experiment, testing hypotheses, units and dimensional analysis. Accuracy and analysis of experimental results.
- Mechanics: One dimensional motion, velocity, acceleration. Forces, gravity, normal force, friction. Newton's laws of motion. Force equilibrium. Work, energy, power. Potential and kinetic energy. The energy principle. Linear momentum, impulse, conservation of linear momentum. Pressure. Archimedes principle.
- Theory of heat: Internal energy, temperature, heat capacity, phase transitions. Different forms of heat transport. Different energy forms. Exergy, entropy and efficiency of energy conversion. Orientation about energy resources and use of energy in a sustainable society. Orientation about atmospheric physics and methods of climate and weather prediction.
- Electricity: Electric charge, influence, Coulombs law, electric field strength, potential, voltage, current, power. Resistance, Ohms law. Resistance in series and in parallel. Kirchoff's first and second law. Electromotive force and terminal voltage. Measurements with ampere- and voltmeter.
- Modern physics: the postulates of special relativity, time dilation. The mass-energy equivalence. The structure of the atomic nucleus, binding energy, the strong force, nuclear reactions, fission and fusion. Radioactive decay, ionizing radiation, particle radiation, half-life and activity. Interaction between different kinds of radiation and biological systems, absorbed and equivalent dose, radiation safety. Orientation about electromagnetic radiation and its particle property. Orientation about applications of radiation in medicine and technology. Orientation about the standard model of matter and the fundamental forces.

Teaching and working methods

The course lasts two periods (part of ht1 and all of ht2). Teaching consists of lectures, tutorials and compulsory laboratory work. Literature study and problem solving during self study time is also part of the course.

Examination

| | | | |
|------|---------------------|--------|------------|
| LAB1 | Laboratory work | 2 fup | U, G |
| KTR1 | Written test | 0 fup | U, G |
| TEN1 | Written examination | 10 fup | U, 3, 4, 5 |

The result of the optional written test can be counted as part A of the written examination during the academic year when the result was achieved.

Attempts to deceive by the use of prohibited aids or other methods during examinations or other forms of assessments of study performance may lead to a failed result on the examination/assessment in question.

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

Supplementary courses: Physics 2, Foundation year.

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is Swedish, the course as a whole or in large parts, is taught in Swedish. Please note that although teaching language is Swedish, parts of the course could be given in English. Examination language is Swedish.
- If teaching language is Swedish/English, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English (depending on teaching language).
- If teaching language is English, the course as a whole is taught in English. Examination language is English.

Other

The course is conducted in a manner where both men's and women's experience and knowledge are made visible and developed.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

Adriana Serban

Examiner

Ulf Sannemo

Education components

Preliminary scheduled hours: 90 h

Recommended self-study hours: 230 h

Course literature

Books

Fraenkel, Lars, Gottfridsson, Daniel, Jonasson, Ulf, (2011) *Impuls Fysik 1* 1. uppl.,
2. tr. Gleerups Utbildning AB

ISBN: 9140674150, 9789140674159

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.