Physics 1 for Foundation Year

Academic preparatory

12 fup

Fysik 1 för basår

BFN101

Valid from: 2019 Spring semester

Determined by
Board of Studies for Chemistry, Biology and Biotechnology

Date determined
2018-08-31

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 end kinetic energy. The energy principle.Linear momentum,impulse.conservation of linear momentum.Pressure.Archimedes principle.
- Theory of heat: Internal energy, temperature,heat capacity, phase transisitions. 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 atmospherical 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 enrgy,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 equaivalent 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 reulst was achieved.

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

Other information
Supplementary courses: Physics 2, Foundation year.

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

Course syllabus

A syllabus has been established for each course. The syllabus specifies the aim and contents of the course, and the prior knowledge that a student must have in order to be able to benefit from the course.

Timetabling

Courses are timetabled after a decision has been made for this course concerning its assignment to a timetable module. A central timetable is not drawn up for courses with fewer than five participants. Most project courses do not have a central timetable.

Interrupting a course

The vice-chancellor's decision concerning regulations for registration, deregistration and reporting results (Dnr LiU-2015-01241) states that interruptions in study are to be recorded in Ladok. Thus, all students who do not participate in a course for which they have registered must record the interruption, such that the registration on the course can be removed. Deregistration from a course is carried out using a web-based form: www.lith.liu.se/for-studenter/kurskomplettering?l=sv.

Cancelled courses

Courses with few participants (fewer than 10) may be cancelled or organised in a manner that differs from that stated in the course syllabus. The board of studies is to deliberate and decide whether a course is to be cancelled or changed from the course syllabus.

Regulations relating to examinations and examiners

Details are given in a decision in the university's rule book: http://styrdokument.liu.se/Regelsamling/VisaBeslut/622678.

Forms of examination

Examination

Written and oral examinations are held at least three times a year: once immediately after the end of the course, once in August, and once (usually) in one of the re-examination periods. Examinations held at other times are to follow a decision of the board of studies.

Principles for examination scheduling for courses that follow the study periods:

- courses given in VT1 are examined for the first time in March, with re-

examination in June and August
- courses given in VT2 are examined for the first time in May, with re-examination in August and October
- courses given in HT1 are examined for the first time in October, with re-examination in January and August
- courses given in HT2 are examined for the first time in January, with re-examination at Easter and in August.

The examination schedule is based on the structure of timetable modules, but there may be deviations from this, mainly in the case of courses that are studied and examined for several programmes and in lower grades (i.e. 1 and 2).

- Examinations for courses that the board of studies has decided are to be held in alternate years are held only three times during the year in which the course is given.
- Examinations for courses that are cancelled or rescheduled such that they are not given in one or several years are held three times during the year that immediately follows the course, with examination scheduling that corresponds to the scheduling that was in force before the course was cancelled or rescheduled.
- If teaching is no longer given for a course, three examination occurrences are held during the immediately subsequent year, while examinations are at the same time held for any replacement course that is given, or alternatively in association with other re-examination opportunities. Furthermore, an examination is held on one further occasion during the next subsequent year, unless the board of studies determines otherwise.
- If a course is given during several periods of the year (for programmes, or on different occasions for different programmes) the board or boards of studies determine together the scheduling and frequency of re-examination occasions.

Registration for examination

In order to take an examination, a student must register in advance at the Student Portal during the registration period, which opens 30 days before the date of the examination and closes 10 days before it. Candidates are informed of the location of the examination by email, four days in advance. Students who have not registered for an examination run the risk of being refused admittance to the examination, if space is not available.

Symbols used in the examination registration system:

** denotes that the examination is being given for the penultimate time.

* denotes that the examination is being given for the last time.

Code of conduct for students during examinations

Details are given in a decision in the university's rule book:
http://styrdokument.liu.se/Regelsamling/VisaBeslut/622682.

Retakes for higher grade

Students at the Institute of Technology at LiU have the right to retake written examinations and computer-based examinations in an attempt to achieve a higher grade. This is valid for all examination components with code “TEN” and "DAT". The same right may not be exercised for other examination components, unless otherwise specified in the course syllabus.

Retakes of other forms of examination

Regulations concerning retakes of other forms of examination than written examinations and computer-based examinations are given in the LiU regulations for examinations and examiners, http://styrdokument.liu.se/Regelsamling/VisaBeslut/622678.

Plagiarism

For examinations that involve the writing of reports, in cases in which it can be assumed that the student has had access to other sources (such as during project work, writing essays, etc.), the material submitted must be prepared in accordance with principles for acceptable practice when referring to sources (references or quotations for which the source is specified) when the text, images, ideas, data, etc. of other people are used. It is also to be made clear whether the author has reused his or her own text, images, ideas, data, etc. from previous examinations.

A failure to specify such sources may be regarded as attempted deception during examination.

Attempts to cheat

In the event of a suspected attempt by a student to cheat during an examination, or when study performance is to be assessed as specified in Chapter 10 of the Higher Education Ordinance, the examiner is to report this to the disciplinary board of the university. Possible consequences for the student are suspension from study and a formal warning. More information is available at https://www.student.liu.se/studenttjanster/lagar-regler-rattigheter?l=sv.

Grades

The grades that are preferably to be used are Fail (U), Pass (3), Pass not without distinction (4) and Pass with distinction (5). Courses under the auspices of the faculty board of the Faculty of Science and Engineering (Institute of Technology) are to be given special attention in this regard.

1. Grades U, 3, 4, 5 are to be awarded for courses that have written examinations.
2. Grades Fail (U) and Pass (G) may be awarded for courses with a large degree of practical components such as laboratory work, project work and group work.

Examination components

1. Grades U, 3, 4, 5 are to be awarded for written examinations (TEN).
2. Grades Fail (U) and Pass (G) are to be used for undergraduate projects and other independent work.

3. Examination components for which the grades Fail (U) and Pass (G) may be awarded are laboratory work (LAB), project work (PRA), preparatory written examination (KTR), oral examination (MUN), computer-based examination (DAT), home assignment (HEM), and assignment (UPG).
4. Students receive grades either Fail (U) or Pass (G) for other examination components in which the examination criteria are satisfied principally through active attendance such as other examination (ANN), tutorial group (BAS) or examination item (MOM).

The examination results for a student are reported at the relevant department.

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://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.