Joint Faculties of Humanities and Theology

ÄFYD32, Physics 2: Energy and Environmental Physics, 7.5 credits

Fysik 2: Energi- och omvärldsfysik, 7,5 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by The Education Board of Faculty of Science on 2025-05-30. The syllabus comes into effect 2025-05-30 and is valid from the spring semester 2026.

General information

The course is a component of the teacher education programme at Lund University.

Language of instruction: Swedish

Main field of study	*Specialisation*
Physics	G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is for students to develop a practically applicable understanding of fundamental concepts and relationships in physics, in particular thermodynamics, climate and radiation. The course provides a tool for better understanding of physical concepts, theories and practical experience with a focus on energy and energy supply. The course also aims to train the student in modelling, problem solving and experimental methodology. The course further aims to provide perspectives on and problematise the development of a sustainable society.

Knowledge and understanding

To pass the course, the student shall be able to

- apply modelling in the form of mathematical models, analogies and images to describe laboratory experiments and reality

- describe and analyse phenomena, in particular energy flows, energy transformations and energy exchanges, in nature and in technological systems using physical concepts
- describe the impact of human energy use on the environment and thus on the conditions for life on Earth.

Competence and skills

To pass the course, the student shall be able to

- apply models to analyse, apply and describe physical and engineering problems apply the physics and experimental methods presented in the course, and relate these to practical tasks
- being able to write a structured laboratory report in which for example experimental data is presented and analysed
- communicate (in writing) and present (orally) a more or less complex problem related to sustainability, to people with different educational backgrounds.

Judgement and approach

To pass the course, the student shall be able to

- demonstrate insight into the possibilities and limitations of physics, especially in relation to future technology development and sustainability
- recognise their own need to expand their knowledge in this and other areas of knowledge
- explain perspectives on the energy issue beyond the scientific ones and the complexity that can be found in real-life problems.

Course content

Experimental methodology: Management, analysis and presentation of measurement data and models.

Gases and liquids: Pressure. Ideal and real gases. Fluid flow.

Energy: Temperature and heat. The main theorems of thermodynamics, changes of state and circuit processes. Heat engines, refrigerators and heat pumps. Statistical description of thermodynamics. Entropy. Heat transfer; conduction, convection, temperature radiation, radiation balance. Greenhouse effect. Climate modelling. Ionising radiation - X-rays and radioactive radiation - origin and interaction with matter. Activity, absorbed dose and dose equivalent. Applications.

Course design

The teaching consists of lectures, calculation exercises, seminars and supervision in connection with laboratory work. Participation in laboratory sessions and seminars is compulsory. Attendance at any of the first three lectures is mandatory for access to the course

Assessment

Examination takes place in writing in the form of a written examination at the end of the course and through written laboratory reports and written oral presentation of a project during the course, and through active participation in compulsory components. The compulsory elements consist of laboratory work and seminars.

For students who have not passed the regular exam, an additional examination is offered during the scheduled resit period.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

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Grades

Grading scale includes the grades: Fail, Pass, Pass with distinction
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The grading scale for the written exam is Fail, Pass, Pass with distinction, while the laboratory reports and project presentation is graded Fail, Pass.

The final grade is determined by the grade for the written exam.

Entry requirements

To be admitted to the course, students must have successfully completed 15 credits from ÄFYD11, Physics 1: Introductory Physics and Physics Education, 30 credits, general entry requirements and Physics 2/B, Math 4/D, English 6/B.

Further information

The course cannot be included in the degree together with ÄFYD12, ÄFYD22, FYSA15, FYSA25, FYSA14, FYSA01, FYSA07 eller FYSA11.

The course is co-taught with FAFA70 Energy and Environmental Physics, 7.5 credits, which is a compulsory course in the Ecosystem Engineering (W) programme at LTH.

The examination of the course is scheduled in accordance with the LTH exam schedule.

The course is offered at the Department of Physics, Lund University