



Faculties of Humanities and Theology

ÄFYA22, Physics II, 15 credits

Fysik II, 15 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus is an old version, approved by Study programmes board, Faculty of Science on 2015-01-13 and was valid from 2015-01-19, spring semester 2015.

General Information

The course is included in the Master's programme in Secondary Education specialising in Physics as a first or second subject in upper secondary school or as first, second or third subject in forms 7-9, offered jointly by Kristianstad, Lund and Malmö universities.

Language of instruction: Swedish

Main field of studies

-

Depth of study relative to the degree requirements

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is that students should have acquired the following knowledge and skills on completion of the course:

1. describe, formulate and interpret physical and mathematical models of relevance to the course content
2. plan, execute, critically analyse and report experiments in the context of energy and wave physics
3. adopt a scientific, analytical and reflecting approach to the contents of the course with regard to both teaching and subject matter
4. describe and analyse energy systems, e.g. the energy balance of earth and its fluctuations, and energy conversions and changes in energy quality caused by the use in society and households
5. account for and analyse issues of physics teaching with regard to the subject matter, especially with regard to aspects of inclusion/exclusion

This is a translation of the course syllabus approved in Swedish

6. interrogate the character and role of science in society, and discuss this in relation to pupils' interest in science
7. contribute arguments based in science to complex public issues and critically review and assess the arguments of others
8. design teaching components in physics based on public issues

Course content

The course deals with issues of energy supply and global issues of the environment and sustainability. Knowledge in physics is required for analysing these issues.

The key fields and concepts of the course are:

Energy: sustainable development and energy; the energy balance of earth and climate change; aggregation states, internal energy, heat transport; thermal radiation; the principles of thermodynamics; statistical physics; energy quality, exergy and entropy, heat engines.

Waves: mechanical and electromagnetic waves, beam optics, wave optics, sound.

The role of science in society, in school and for individuals is a recurring theme in the course. Different aspects are addressed and interrogated: science as a foundation for positions in a democratic society, as a part of our culture and as a factor in technical, financial and social development.

Among the fields of subject teaching interrogated in connection with the course content are public issues and argumentation in physics teaching, pupils' ideas and learning of the concepts of physics, models and the character of physics/science, key knowledge elements, pupils' interests and attitudes, and the roles of different activities of physics teaching.

Different aspects of the character and culture of science are studied in depth and analysed. This is especially the case with regard to public issues and the research front in science based on the subject matter of the course.

Course design

The teaching consists of different elements: lectures, laboratory sessions, planning of teaching sequences, study visits, seminars etc

The laboratory sessions require compulsory participation. The course design is based on the outcome of evaluations of previous students on the course.

Assessment

The assessment is based on:

Assessment 1 (3 credits): Compulsory laboratory sessions including laboratory reports in varying forms. Assessment of learning outcome 2.

Assessment 2 (9 credits): Individual written exam. Assessment of learning outcomes 1, 3-5.

Assessment 3 (3 credits): Planning and presentation of a teaching sequence. Assessment of learning outcomes 6-8.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

For a grade of Pass on the whole course, the student must have been awarded this grade on all assessments. For a grade of Pass with Distinction on the whole course, the student must have been awarded this grade on the majority of the assessments.

Entry requirements

To be admitted to the course, students must have knowledge corresponding to course ÄFYA11 or the equivalent.

Subcourses in ÄFYA22, Physics II

Applies from V16

- 1512 Exam in Energy Processes and Thermodynamics, 4,5 hp
Grading scale: Fail, Pass, Pass with distinction
- 1513 Exam in Optics and Waves, 4,5 hp
Grading scale: Fail, Pass, Pass with distinction
- 1515 Experimental Workshops, 1,5 hp
Grading scale: Fail, Pass, Pass with distinction
- 1516 Didactics of Physics, 4,5 hp
Grading scale: Fail, Pass, Pass with distinction

Applies from V15

- 1501 Laboratory Exercises, 3,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 1502 Written Exam, 9,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 1503 Planning and Presentation of a Teaching Sequence, 3,0 hp
Grading scale: Fail, Pass, Pass with distinction