

FYSA25, Physics: Environmental Physics, 15 credits

Fysik: Miljöfysik, 15 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2021-06-11 and was last revised by The Education Board of Faculty of Science on 2024-05-13. The revised syllabus comes into effect 2024-05-13 and is valid from the spring semester 2025.

General information

The course is a compulsory course for first-cycle studies for a Bachelor's degree in Environmental sciences and is included as an optional course in the Environment and health science programme at Lund University.

Language of instruction: Swedish

Some parts of the course may be given in English.

Main field of study Specialisation

Physics	G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements
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Environmental Science	G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements
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Learning outcomes

The overarching aim of the course is that the student should acquire fundamental knowledge in physics with relevance in environmental science. The student should also practice on carrying out physical experiments, present results and assess the role of physics in energy and environmental technology.

Knowledge and understanding

On completion of the course, the student shall be able to:

- give an account of basic thermodynamic processes and applications of these

- describe important phenomena in the physics of waves
- explain what sound and noise is and describe how to protect oneself from noise
- give an account of different types of ionising radiation, with special focus on interactions in matter
- give an account of important physical processes in the atmosphere with importance for the earth's climate
- describe the occurrence of magnetic fields in our environment and give a general account of their origin and for the connections between these and electric currents.

Competence and skills

On completion of the course, the student shall be able to:

- plan and carry out simple physical experiments
- evaluate and present results of experiments
- carry out simple calculations and estimates of magnitude in relevant fields of environmental physics
- search for and present information orally from scientific sources as well as from public authorities and companies.

Judgement and approach

On completion of the course, the student shall be able to:

- demonstrate an understanding of the role of physics in society, especially with regards to energy and environmental technology
- demonstrate an understanding of the risks of ionising and non-ionising radiation
- critically discuss the possibilities of current and future technologies, limitations and risks
- critically review information on environmental physics in e.g. mass media
- reflect on progress in terms of knowledge and competence based on the course goals and own goals.

Course content

The course includes a basic overview of areas within physics as well as applications of physics within the environmental area.

Energy and thermodynamics are treated in detail to create an understanding of the principles of energy transformation, energy flows and energy use. The course also includes an atmospheric physics-based understanding of mixing and transport in the atmosphere, the radiation balance of the earth, and climate changes. The wave physics part includes concepts such as interference, resonance, noise and noise cancellation, and their effect on environment/working environment. The origin of magnetic fields and physiological risks are brought up. The course also covers the atomic and molecular physics foundations of measurement techniques in the environmental area. The ionising and non-ionizing radiation part treats the origins of alpha, beta and photon radiation, and their properties, detection and physiological

effects.

During the course, connections are made to current issues concerning the role of physics in the environmental area and in society.

The course also provides students with an awareness of and use of tools for the collection, processing and presentation of physics data.

Course design

The teaching consists of teaching sessions, group tuition, seminars and supervision in connection with laboratory sessions. Participation in seminars and the laboratory sessions are compulsory.

Assessment

Examination takes place in writing in the form of an examination at the end of the course and through written laboratory reports during the course, and through active participation in compulsory components. The compulsory components consist of seminars and submission of individual reflection around own learning.

Students who do not pass a regular assessment will be offered another opportunity for assessment soon thereafter. Course components that are not completed - compulsory components and presentations - can be compensated for following an agreement with the lecturer/s and the director of studies.

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.

Grades

Grading scale includes the grades: Fail, Pass, Pass with distinction

To pass the whole course requires approved written examination, approved laboratory reports, approved participation in seminars, and submitted individual reflection around the student's own learning.

The grading scale for written examination and laboratory sessions are Fail, Pass and Pass with distinction. The grading scale for participation in seminars and submitted individual reflection are Fail, Pass.

The final grade is decided through a weighting of the results of the examination (1/3) and the written assignments (2/3).

Entry requirements

Admission to the course requires 15 credits of studies in Science, including knowledge equivalent to one the the following courses:

- MVEA10 Environmental sciences: Basic course, 15 credits,
- Biology: Cell- and Microbiology, 15 credits or
- Physical Geography: Introd to the Global Environment, 15 credits.

Further information

The course cannot be included in qualification together with FYSA15 Environmental Physics 15 credits.

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