SK1150 Fundamental Physics I 9.0 credits

Grundläggande fysik I

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for SK1150 valid from Autumn 2026. Dnr: HS-2026-0354

Grading scale

A, B, C, D, E, FX, F

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Active participation in SF1625 and SF1624 or equivalent courses

Intended learning outcomes

After completing the course, the student should be able to:

- understand questions and solve technical problems relevant to their program that are connected to mechanics, especially fluid mechanics, electric and magnetic fields, spectroscopy, as well as mechanical and electromagnetic waves.

- understand and explain physical problems, conditions, and limitations, as well as applications, for both technically trained and non-technical collaborators.
- make order-of-magnitude and plausibility estimates related to physical questions.
- use and understand the limitations of physical measurement methods and instruments, and have insight into their role in society, applying the technology with social responsibility.
- evaluate and present physical measurements in text and diagrams, both individually and in groups.

By “physical” above is meant the part of physics included in the course content below.

Course contents

Mechanics:**
**Force, torque, momentum, and angular momentum in statics and particle dynamics. Introduction to fluid mechanics. Applications in the field of biotechnology.

Electrostatics:**
**Electric force, electric field strength and potential, Gauss’s law, electric field and electric potential in metals and dielectrics, the principle of the capacitor, electrostatic energy. Applications in biotechnology.

*Magnetic Fields:
*Origin of magnetic fields, magnetic force, magnetic materials and circuits, magnetic energy. Electromagnetic induction. Effects of alternating fields on the human body. Applications in biotechnology.

Basic Wave Concepts:**
**Mechanical waves and acoustics with applications to gases and liquids. Generation of electromagnetic waves, properties of light, the law of refraction, polarization, interference, and diffraction. Coherence. The laser. Applications in biotechnology.

*Atomic Physics:
*Spectroscopic measurement methods.

*General:
*Modern physical methods with applications in biotechnology.

Examination

- INL1 - Home Assignments, 1.0 credits, grading scale: P, F
- TEN1 - Written Exam, 6.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Experiments, 2.0 credits, grading scale: P, F

Based on recommendation from KTH’s coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

• INL1 – Assignments, 1.0 credits, grading scale: P, F

• LAB1 – Laboratory work, 2.0 credits, grading scale: P, F

• TEN1 – Exam, 6.0 credits, grading scale: A, B, C, D, E, FX, F

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.