MH1026 Materials Physics 6.0 credits

Materialfysik

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

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

Establishment

Course syllabus for MH1026 valid from Autumn 2019

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Knowledge equivalent to courses in Calculus, Algebra and Geometry, Mechanics, Ceramics and Materials Science of metallic materials

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course, the student should be abel to:

- The physics that can be used to understand how the material works. Most physical properties involves electronic properties and what this leads to in terms of interaction with electricity and electromagnetic waves.

Students are expected to have skills and abilities:

- To be able to switch between a macroscopic approach - call it engineering or 'mathematical fysik' and a microscopic we analyze individual atoms.
- To reflect, to derive and model various phenomenas, such as a magnetic compass.

Course contents

The first part is classical physics as a starting point, while the second part introduces elementary quantum mechanics. A lab is also included where experimental data from surveys and experiments are presented in a technical report.
• Content - Classical Physics
• Electrical conductors
• Optical properties of conductors
• Insulators / dielectrics
• Optical properties of insulators
• Magnetic properties and materials
• Superconductors
• Vibration / elastic waves in materials
• Content - Quantum Mechanics
• Light is particles - electrons are waves Planck + - + Schrödinger quantization
• Free electron model
• Nearly free electron model
• Metals - insulators
• Semiconductors
•Pn-transition-photodiodes, LEDs, etc.

Course literature

Meddelas i kurs PM, vid kursstart.

Examination

- LAB1 - Laboratory Work, 1.5 credits, grading scale: P, F
- TEN1 - Written examination, 4.5 credits, grading scale: A, B, C, D, E, FX, 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.

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.