SI1121 Thermodynamics 6.0 credits

Termodynamik

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

Establishment

Course syllabus for SI1121 valid from Autumn 2011

Grading scale

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

Education cycle

First cycle

Main field of study

Physics, Technology

Specific prerequisites

Mandatory for first year students. Prerequisits: High-school physics and mathematics

Language of instruction

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

Intended learning outcomes

After completing the course you should be able to

- explain the concept of energy and how energy can be stored and converted.
- realize the importance of thermodynamics in everday phenomena
- be familiar with the power and limitations of thermodynamic models
- be able to make qualitative estimations, particularly focused on sustainability.

Course contents

Thermodynamics: energy estimation, ideal and real gas laws, kinetic gas theory, black-body radiation, energy transport through conduction and radiation, enthalpy and entropy, the laws of thermodynamics, adiabatic transformations, the Carnot cycle, heat engines and heat pumps, phase transitions. Physical models and validiy, dimensional analysis, estimation and error analysis. Susutainability form an energy perspective.

Project: Develop oral and written presentation skills and develop ability to find information and working in groups.

Course literature

- O. Beckman, G. Grimvall, B. Kjöllerström och T. Sundström, "Energilära", Liber 2005.
- Young & Freedman, University Physics, chapter 17-20
- Exempelsamling, teoretisk fysik. KTH.
- Grimvall, G., Basic skills in physics and engineering science, teoretisk fysik, KTH, 2010
- Laboratory instructions.

Examination

- INL1 - Hand in Task, 1.0 credits, grading scale: P, F
- TEN1 - Written Examinations, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 1.0 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.

The aim for the examination to conatin problems closely tied to every-day phenomena and sustainability form an energy perspective.

Other requirements for final grade

Written exam (TEN1, 4hp), assignment (INL1, 1hp) and lab (LAB1; 1 hp)

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.