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 2014

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

TEN1:

- Solve analytic problems on the “Main Contents” below and present a clear solution with a correct answer.
- Apply the theory of thermodynamics to describe everyday phenomena.
- Appraise the power and limitations of thermodynamic models.
- Make qualitative estimations, particularly focused on the energy aspects of sustainable development.

PRO1:

- Write an essay on an engineering topic using clearly structured paragraphs.
- Give a computer supported oral presentation in fron of the class on a technical topic focused on delivering a clear message to the audience.

LAB1:

- Successfully perform thermodynamic experiments following instructions in the lab PM.

Course contents

Forms of Energy, ideal and real gas laws, kinetic gas theory, black-body radiation, energy transport through conduction and radiation, the laws of thermodynamics, enthalpy and entropy, adiabatic transformations, the Carnot cycle, heat engines and heat pumps, phase transitions. Physical models and validity, dimensional analysis, estimation and error analysis. Sustainable development from an energy perspective.

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, 2006
- Laborationsinstruktioner.

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 contain problems closely tied to every-day phenomena and sustainability from 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.