



# SG1216 Thermodynamics 6.0 credits

## Termodynamik

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

## Establishment

Course syllabus for SG1216 valid from Spring 2020

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

Completed courses SG1132 Mechanics I with project and SF1626 Multi-variable analysis.

## 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, the student should be able to

- Identify different types of thermodynamic systems and explain how they convert and exchange energy with their environment,
- Perform thermodynamic / fluid mechanical calculations on different types of systems with particular focus on vehicle engineering,
- Understand text that contains thermodynamic terminology, and communicate reasoning and calculations within thermodynamics orally and written in such a way that they are easy to follow,
- Relate thermodynamic concepts and calculation results to energy management and the possibility of extracting work from various energy resources with a particular focus on sustainable development.
- Show the ability to relate the measurement data, phenomena and processes in the laboratory environment to the theoretical description of thermodynamics.

## Course contents

First law, inner energy, enthalpy, heat and  $pV$ -work. Ideal gases. Phase transformations, solid materials, liquids and gases. Open systems and flow machines. Compressible flow, nozzles. The second law of thermodynamics. Heat engines. Entropy. Shock waves. Exergy.

## Course literature

Kompendium i Termodynamik

Young & Freedman, University Physics.

Nakayama & Boucher, Introduction to Fluid Mechanics, Buttworth-Heinemann, 1999.

## Examination

- INL1 - Hand in Task, 1.5 credits, grading scale: P, F
- TEN2 - Examination, 0.5 credits, grading scale: P, F
- KON2 - Control Test 2, 1.5 credits, grading scale: P, F
- KON1 - Control Test 1, 1.5 credits, grading scale: P, F
- LAB1 - Laboration, 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.

INL: A compulsory project assignment that is based on active participation at the seminars and that the laboratory work is carried out.

LAB: A compulsory laboratory work with a heat engine, which is carried out in groups of four students.

TEN: The part is approved when both exam parts are approved, regardless of the results from the final exam.

ECTS final grade: The grade is based on the total score on the exam parts and on any results from the final exam. Results from the exam parts can give a maximum grade of C.

The examiner, in consultation with the KTH coordinator for disability (Funka), decides on any adapted examination for students with documented, permanent disability. The examiner may allow another examination form 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.