



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Termodynamik med tillämpningar Thermodynamics with Applications

FAFA45, 7,5 credits, G1 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED N

Date of Decision: 2023-04-17

General Information

Main field: Technology.

Compulsory for: V1

Language of instruction: The course will be given in Swedish

Aim

The aim of this course is for the student to acquire a fundamental knowledge of the concepts and laws of thermodynamics and its applications. With this knowledge as a tool, the student will also be able to develop her understanding of technical applications in areas adjacent to thermodynamics. The course will also problematize and give perspectives on the rôle of an engineer in the development of a sustainable society.

The course will also train the student's ability of problem solving, modelling, experimental work and written communication. The course is also aiming at stimulating the student to apply physics in explaining everyday phenomena.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- be able to apply model thinking in the form of mathematical models, analogies and images to explain experiments and physical reality
- be able to describe and analyse phenomena in nature and in technical systems using physical concepts, in particular energy flows, energy transformations and energy exchanges.

Competences and skills

For a passing grade the student must

- be able to use physical models to analyze, understand and describe different technical problems
- be able to use the experimental methods presented in the course and relate these to real-life tasks for the engineer
- be able to write a well-structured project report in which experimental data are presented and analyzed.

Judgement and approach

For a passing grade the student must

- be able to evaluate experimental methods used in the course
- show insight about the limitations and possibilities of physics, especially in the perspective of future technical advance
- be able to identify their own need for further learning within the area of knowledge, and suggest where to find the information needed.

Contents

Problem solving. Measurements, experiments, analysis and presentation of experimental data. Temperature and heat. Pressure. Ideal gases. Flow of fluids - Bernoulli's equation. Laws of thermodynamics. Changes of state, work and cyclic processes. Heat engines: refrigerators and heat pumps. Heat transfer: conduction, convection and radiation. Climate and the green-house effect. Electric and magnetic fields. Electric circuits. Direct and alternating current, three phase power. Electrical appliances, safety aspects.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Passed laboratory work and reports. Passed written exam. The result of the written examination settles the final grade. It is mandatory to attend the first lecture in order to be admitted to the course

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0123. **Name:** Written Examination.

Credits: 6. **Grading scale:** TH. **Assessment:** Written exam.

Code: 0223. **Name:** Laboratory Exercises.

Credits: 1,5. **Grading scale:** UG. **Assessment:** Active participation in laboratory exercises (mandatory). Passed written laboratory exercise presentations. **Contents:** Laboratory exercises

Admission

The number of participants is limited to: No

The course overlaps following course/s: FAF220, FAF604, FAFA15, FAFA20, FAFA30, FAFA35, FAFA40, FAF108, FAFA05, FAFF25, FAFA65, FAFA70, FAFA75

Reading list

- Göran Jönsson: Fysik i vätskor och gaser. Teach support, 2018, ISBN: 978-91-637-9826-9. 9th edition, printed in 2018.
- Kurslaboratoriet för fysik, LTH: Experimentell metodik. 2022. Course material available through Canvas.
- Göran Jönsson: Tillämpad ellära. Teach Support, 2019, ISBN: 978-91-519-3616-1. 2nd edition, printed 2019.
- Kurslaboratoriet för Fysik, LTH: Laborationshandledningar. 2022. Laboratory exercise instructions are available through Canvas.

Contact and other information

Course coordinator: Martin Magnusson, martin.magnusson@ftf.lth.se

Course homepage: <http://> <https://canvas.education.lu.se>

Further information: It is mandatory to attend the first lecture in order to be admitted to the course. Some elements may be taught and assessed in English. This includes a maximum of 1.5 hp, in the form of laboratory sessions or written assignments.