



Course syllabus

Energiteknik Heat Engineering

KETF30, 7,5 credits, G2 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED B/K

Date of Decision: 2023-04-18

General Information

Main field: Technology.

Compulsory for: K3

Language of instruction: The course will be given in Swedish

Aim

The aim of the course in heat engineering is to further develop students knowledge of heat exchange by going deeper in the systems for boiling and condensation, and by inserting heat exchange processes in larger process systems. A second objective of the course is to introduce a number of technically important energy conversion processes, such as combustion engines, steam turbines, gas turbines and compressors which chemical engineers in the process and energy industries come in contact with.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- independently define and analyse various processes for energy conversion.

Competences and skills

For a passing grade the student must

- apply heat transfer theory to heat exchanger problems including phase transition
- apply thermodynamics to important cooling and heating processes
- present solutions to thermal energy problems in a technical report

Contents

Heat exchangers. Calculation of heat transfer coefficients. Radiation. Boiling. Condensation. Fundamentals of thermodynamics. The heat engine cycle. Combustion. Gas turbine cycles. Refrigeration and heat pumps. Compressors. Energy efficiency in thermal separation processes mainly distillation and evaporation.

Examination details

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

Assessment: Written examination. Project assignments presented in written reports, laboratory assignments and study visit. The grade is based on the written examination.

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: 0117. **Name:** Heat Engineering.

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

Code: 0217. **Name:** Compulsory Assignments.

Credits: 1,5. **Grading scale:** UG. **Assessment:** Active participation in project assignments and peer review of written reports.

Code: 0317. **Name:** Laboratory Work.

Credits: 0. **Grading scale:** UG. **Assessment:** Active participation in laboratory assignments. Study visit.

Admission

Admission requirements:

- KETF01 Transport Phenomena, Basic Course
- KETF10 Separation Processes, Basic Course

The number of participants is limited to: No

The course overlaps following course/s: KET030

Reading list

- Merle C. Potter, Craig W. Somerton: Thermodynamics for Engineers, Third edition. McGraw-Hill Education, 2014, ISBN: 978-0-07-183082-9.
- Mattias Alveteg (editor): Handbook, Physical Properties, Correlations and Equations in Chemical Engineering. MediaTryck, 2018. Updated yearly by the Dept of Chemical Engineering, version history available.

Contact and other information

Course coordinator: Ola Wallberg, ola.wallberg@chemeng.lth.se

Course homepage: <https://www.ple.lth.se/en/>