

**SYLLABUS**

# **Thermal and Hydraulic Components 7.5 credits F0057T**

**Energitekniska komponenter**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

DECISION DATE  
**2022-02-14**

# Thermal and Hydraulic Components 7.5 credits F0057T

## Energitekniska komponenter

### First cycle, F0057T

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Energiteknik	Energy Technology

### Main field of study

Energy Engineering

## Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and basic mathematics as well as thermodynamics and hydro mechanics. This knowledge can for example be obtained in F0004T Physics 1, M0029M Differential calculus, F0031T Hydromechanics and F0032T Thermodynamics and Heat Transfer.

## Selection

The selection is based on 1-165 credits.

## Course Aim

After completing the course, you can

1. Knowledge and understanding
  - describe different thermal and hydraulic machines, such as pumps, fans, compressors, heat exchangers, combustion chambers, solar panels, solar cells and heat pumps
  - explain how thermal and hydraulic machines work, and the advantages and disadvantages of different designs
  - interpret pump and fan diagrams
2. Skills and abilities
  - calculate the power, energy flows, thermal efficiencies and coefficients of performance of thermal and hydraulic machines
  - design thermal and hydraulic machines
3. Assessment and attitude
  - evaluate different technical designs of thermal and hydraulic machines
  - discuss sustainable technical solutions

## Contents

- different designs of pumps, fans, compressors, heat exchangers, combustion chambers, solar panels, solar cells, and heat pumps
- turbo machines with radial and axial design
- velocity triangles, uniformity and specific speed
- regulation (throttling, frequency regulation, vanes and adjustable blades)
- pumps, including cavitation and pump diagrams
- fans, including fan diagrams
- compressors, including staged compression
- countercurrent and concurrent heat exchangers
- coefficient of performance for heat pumps
- calculate stoichiometric amount of air and reaction products at complete combustion

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Lectures and compulsory laboratory work.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Examination is done through written evaluations. Laboratories and hand-ins are mandatory.

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Overlap

The course F0057T is equal to F0049T

## Course offered by

Department of Engineering Sciences and Mathematics

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0003	Compulsory Assignments	G U 3 4 5	7.5	Mandatory	A18	

## Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

## Last revised

by Niklas Lehto, Programme Director 2022-02-14

## Syllabus established

by HUL Mats Näsström 2017-02-14