SYLLABUS

Thermal and hydraulic machines 7.5 credits F0049T

Energiteknisk apparatteknik

Course syllabus admitted: Autumn 2014 Sp 1 - Spring 2016 Sp 4

DECISION DATE
2014-02-14

Luleå University of Technology 971 87 Luleå, Sweden
Phone: +46 (0)920 49 10 00 • Corporate Identity: 202100-2841

LULEÅ TEKNISKA UNIVERSITET

Thermal and hydraulic machines 7.5 credits F0049T

Energiteknisk apparatteknik

First cycle, F0049T

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

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

Selection

The selection is based on 1-165 credits.

Examiner

Erik Elfgren

Course Aim

After completing the course
1. Knowledge and understanding
- you can describe different thermal and hydraulic machines, such as pumps, fans, compressors, heat exchangers, solar panels, solar cells and heat pumps
- you can explain how thermal and hydraulic machines work, and the advantages and disadvantages of different designs
- you can interpret pump and fan diagrams

2. Skills and abilities
- you can calculate the power, energy flows, thermal efficiencies and coefficients of performance of thermal and hydraulic machines
- you can design thermal and hydraulic machines

3. Assessment and attitude
- you can evaluate different technical designs of thermal and hydraulic machines
- you are aware of your own responsibility to develop sustainable technical solutions

Contents

- different designs of pumps, fans, compressors, heat exchangers, 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
- action and reaction turbines
- coefficient of performance for heat pumps

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. Written exam. Mandatory laboratory exercises with written reports. Alternative forms of examination may occur.

Overlap

The course F0049T is equal to F0057T

Literature. Valid from Autumn 2014 Sp 1

- Alvarez, Henrik (1996). Energiteknik del 1 & 2. Studentlitteratur AB. ISBN-10: 9144014120.
- Alvarez, Henrik och Elovsson, Sven Olov (2006). Energiteknik: Formler och tabeller. Studentlitteratur AB. ISBN-10: 9144002335.
- Complementery material, laboration instructions etc posted in the course room in Fronter.

Course offered by

Department of Engineering Sciences and Mathematics

Items/credits

Number	Type	Credits	Grade
0001	Written exam	6	G U 3 4 5
0002	Laboratory work	1.5	U G#

Last revised

by Mats Näsström 2014-02-14

Syllabus established

by Department of Applied Physics and Mechanical Engineering 2010-02-20