DALARNA UNIVERSITY

Course Syllabus

Energy Technology 7.5 Credits*, First Cycle Level 1

Learning Outcomes

After this course, the student should be able to:

- use concepts and theories within thermodynamics, fluid dynamics and heat technology
- perform calculations within the energy technology field on systems as well as single components
- describe the function and practical use of certain components within the energy technology field
- explain the concepts of energy quality and primary energy and how these relate to efficient energy use

Course Content

This course covers the theory behind as well as applications within thermodynamics, fluid dynamics, heat technology, refrigeration technology and heat pump processes.

Energy balances and heat transformations are included in all parts of the course, as well as calculations on systems and components.

In the part concerning basic thermodynamics the forms of energy “heat” and “work” are defined. The thermodynamics, and partly processes, regarding vapors is covered. This leads to cyclic processes, which are the basis for describing systems and perform calculations on e.g. heat pump processes.

Within fluid dynamics flow processes for both liquids and gases are treated. Energy loss/pressure drop for channel/pipe flow is treated both theoretically and in practical calculations. Pressure and flow measurement as well as construction, function and use of pumps and fans are also included.

Within the field of heat technology, heat transfer, including heat exchangers, is treated, both underlying theories and calculations.

An introduction on how to perform calculations on the energy balance of a building, with

regards to heating needs and type of heating system, is included in a part regarding buildings. The conecpts of “primary energy” and “energy quality” are discussed.

In several laboratory exercises measurements are combined with theories and calculations to, among others, determine the coefficient of performance for a heat pump process.

Assessment
Examination of the course is done through:
- mandatory laboratory work, 1.5 HEC pass/fail
- mandatory hand in assignments, 1.5 HEC pass/fail
- written examination, 4.5 HEC 5/4/3/U

Forms of Study
Lectures, calculation exercises, laboratory work, hand in assignments.

Grades
The Swedish grades U, 3, 4, 5.

The course is graded after assessment of the written examination. Grade is given only after all hand in assignments and laboratory exercises has been handed in and approved.

Prerequisites
Building Physics 5 credits, First cycle Level

Subject:
Energy Technology

Group of Subjects:
Energy Technology

Disciplinary Domain:
Technology, 100%

Approved:
Approved 5 February 2015
Valid from 15 April 2015