



# MJ2407 Sustainable Energy Utilisation 9.0 credits

## Uthållig energianvändning

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for MJ2407 valid from Autumn 2010

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

Second cycle

## Main field of study

Mechanical Engineering

## Specific prerequisites

B.Sc. in Engineering with prerequisite in MJ1112 Thermodynamics 9 ECTS, MJ1401 Heat Transfer 6 ECTS and SG1220 Fluid Mechanics 6 ECTS or a combination of these subjects of at least 15 ECTS.

Documented proficiency in english B or equivalent.

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

This course will discuss the utilisation of energy in the present day society, taking into account sustainability and environmental aspects. The course will focus on the technologies used to meet a wide spectrum of energy demands needed for cooling, heating, and ventilation in the built environment.

After the course the student should be able to

- describe different sources of primary energy and assess their environmental impact.
- describe the utilisation of energy in the present day society.
- understand and explain the physics that govern an indoor climate, and assess the changes needed to improve the indoor climate in existing buildings.
- perform heating/cooling load calculations for a single family residence.
- design heaters (radiators) and connecting tubing, and select a proper circulation pump.
- design a ventilation system to provide an adequate air flow of a proper temperature and humidity.
- understand and explain the basic fundamentals of conventional refrigeration systems, including components like heat exchangers, compressors, and expansion valves.
- develop and describe a computer model of a conventional cooling system.
- understand and describe different types of heating systems, and assess their applicability.
- understand and describe the function of passive systems.
- briefly discuss alternative cooling processes.

## Course contents

### Examination

- LAB1 - Laboratory Work, 1.0 credits, grading scale: P, F
- TEN1 - Written exam, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Exercise, 1.5 credits, grading scale: P, F
- ÖVN2 - Exercise, 1.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

## Other requirements for final grade

One examination (TEN1; 5,0 hp), exercises (ÖVN1; 1,5 hp; ÖVN2; 1,5 hp) and lab work (LAB; 1,0 hp).

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.