



# MJ2443 Heating, Cooling and Indoor Climate 6.0 credits

Värme, kyla och inomhusmiljö

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

## Establishment

Course syllabus for MJ2443 valid from Spring 2016

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Mechanical Engineering, Technology and Health

## Specific prerequisites

Bachelor degree in mechanical engineering. Preferably with knowledge in applied thermodynamics (example MJ1112, 9 credits) and heat transfer (example MJ1401, 6 credits).

## Language of instruction

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

## Intended learning outcomes

The aim of the course is give advanced knowledge in handling of different tasks in the areas of heating, cooling and indoor climate. A broad range of energy systems for various types of buildings is treated in lectures, seminars with guest lecturers from industry, study visits, calculation exercises and project work.

After passing the course, the students should be able to:

- Describe the indoor climate requirements for thermal comfort
- Discuss the energy use to achieve thermal comfort in various types of buildings
- Carry out calculations of heating and cooling needs for buildings
- Describe the principles of heat pump technology for heating and cooling in buildings.
- Identify the most important differences between different energy system solutions for buildings.
- Explain the functions of the most important components in heating and cooling system.
- Use known principles and tools to solve and analyse problems within heating and cooling in buildings.
- Design new, highly efficient energy systems for buildings
- Think outside the box and improve the existing and the conventional energy solutions for buildings

## Course contents

Main subjects that are treated in the course are:

Various types of buildings and their energy use. Conventional heating and cooling system in buildings. Current and new technology for heat and cold. Concepts and design details for heat pumping technology (steam compression systems). Components for heat pump systems. Simulation tools for cold and heat calculations in buildings. Calculation tools for heating and cooling system. Analysis of energy performance for heating and cooling systems in buildings.

## Course literature

-Refrigerating Engineering (parts I and II) by Granryd et al.

-Sustainable Energy Utilization by His Havtun and Paulina Bohdanowicz.

The books are available at the reception of the Department, Brinellvägen 68.

## Examination

- INL1 - Written Assignment, 1.5 credits, grading scale: P, F
- TEN1 - Written Exam, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Lessons, 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.

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

-Examination (TEN1; 3.0 cr), (AF)

-Laboratory sessions (LAB1; 1.5 cr), (PF)

-Written assignment (INL1, 1.5 cr), (PF)

## 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.