



# MJ2423 Applied Refrigeration and Heat Pump Technology 6.0 credits

Tillämpad kyl- och värmepumpsteknik

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

## Establishment

On 13/08/2019, the Dean of School of ITM has decided to establish this official course syllabus to apply from spring term 2020 (registration number M-2019-1401).

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Mechanical Engineering

## Specific prerequisites

MJ2407 "Sustainable Energy Utilisation" 9 credits. or the equivalent

## Language of instruction

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

## Intended learning outcomes

To pass the course, the student should be able to:

1. Explain the principles of steam compression systems for heating and cooling, i.e. heat pump systems.
2. Identify and discuss the most important differences between different heat pump solutions in heating and cooling applications.
3. Describe the functions of the main components in the heat pump systems.
4. Solve problems in the fields of heating and cooling by means of the stated principle and the tools.

To receive higher grades the student should also be able to:

5. Solve advanced problems in the fields of heating and cooling.
6. Analyse the performance of the heat pump system and compare performance for different system solutions.
7. Choose and design appropriate system solution for certain cooling and heating applications.
8. Solve more advanced problems in the fields of heating and cooling.
9. Evaluate and suggest improvements of existing system solutions for relevant applications.

## Course contents

The course intends to provide advanced knowledge to handle different assignments in the fridge and heat pump technology.

A wide range of systems for heat pumping and cooling will be treated in lectures, study visits, guest lecturers, problem solving sessions, laboratory exercises and assignments. Some of the most important application fields that are included in the course are:

- Main types heat pumps for room heating and warm water
- Cooling applications, commercial and households
- Geothermal systems
- Heat pumps in district heating and remote cooling networks

The most important system components and the guidelines for efficient system design are also included by the course. Furthermore, the course will discuss the sustainability aspects in heat pumps and introduce the emerging environmentally friendly cooling media.

## Examination

- TEN1 - Written exam, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 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.

## **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.