MJ2433 Advanced Topics in Sustainable Energy Utilisation 12.0 credits

Påbyggnadskurs i uthållig energianvändning

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

Establishment

Course syllabus for MJ2433 valid from Autumn 2008

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

The student should have passed the courses in Sustainable Energy Utilization, MJ2407, Thermal Comfort and Indoor Climate, MJ2422, and Refrigeration and Heat Pump Technology, MJ2423, or have equivalent knowledge.

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 to introduce the students to selected important subjects in the area of energy utilization in the built environment close to the research frontier. A second aim is to widen the students´ knowledge in the area compared to previous courses within the Master's program in Sustainable Energy Engineering.

After the course the student should:

· Be able to calculate energy losses from buildings, and to design buildings so as to minimize these losses.

· Be able to use passive design techniques to decrease the energy demand in buildings.

· Be able to describe different types of benchmarking, energy auditing, environmental assessment systems and energy certification of buildings.

· Be able to describe distributed generation systems for the built environment

· Be able to predict sound propagation in buildings and to design buildings to avoid noise

· Be able to use existing energy labeling of products in the built environment in the choice of components

· Be able to predict the result of a change in the boundary conditions of a vapor compression cycle for heat pumping applications.

· Be able to use tools for predicting performance of vapor compression cycles using refrigerant mixtures

· Be able to perform calculations on absorption refrigeration systems

· Be able to describe the principles behind acoustic and magnetic refrigeration cycles.

· Be able to describe international and European rules and regulations concerning refrigerant use

· Be able to design vapor compression systems in accordance with European rules and regulations

· Be able to describe the special characteristics and necessary precautions when designing for environmentally benign refrigerants

· Be able to describe the use of free cooling and district cooling

· Be able to describe methods of storing heat and cold for the purpose of minimizing the use of prime energy.

Course contents

Course literature

A list of compulsory reading (mainly journal articles) will be handed out during the course.

Examination

- INL1 - Assignment, 1.0 credits, grading scale: P, F
- INL2 - Assignment, 1.0 credits, grading scale: P, F
- TEN1 - Examination, 7.0 credits, grading scale: A, B, C, D, E, FX, F
- INL5 - Assignment, 1.0 credits, grading scale: P, F
- INL3 - Assignment, 1.0 credits, grading scale: P, F
- INL4 - Assignment, 1.0 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.

One written exam

Four home assignments/reports

Other requirements for final grade

A written exam will be given, based on all lectures, including guest lectures, and the list of compulsory reading

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.