MJ2422 Thermal Comfort and Indoor Climate 6.0 credits

Termisk komfort och inomhusmiljö

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

Establishment

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering, The Built Environment

Specific prerequisites

MJ1112 Thermodynamics basic course

MJ1401 Heat transfer

SG1220 Fluid Mechanics

MJ2407 Sustainable Energy Utilization

or equivalent courses

Language of instruction

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

Intended learning outcomes

Upon completing the course the student should be aware of the effects of heating and ventilation on indoor air quality and thermal comfort, as well as the implications on energy management in the built environment. Furthermore students should become familiar with the concept of the environmental building assessment and various assessment schemes and tools commercially available.

Course contents

The objective of this course is to provide a thorough understanding of how ventilation and heating/cooling affect thermal comfort, and air quality indoors, and how this, in turn reflects on energy management in the built environment. Thermal comfort and space-conditioning are analysed against the background of human physiological requirements. Different methods for evaluating thermal comfort and indoor climate are presented as applicable in different indoor environments (industries, offices, dwellings, etc.). Factors affecting air quality are analysed. Gaseous and particulate indoor air pollutants are discussed with regard to acceptable concentrations, health effects, existing regulations/standards and control measures. Ventilation demand and ventilation effectiveness are discussed as determined by requirements of pollutant and heat removal in different indoor environments. Methods for estimating/calculating the energy flows required for achieving specific levels of thermal comfort and air quality are analysed as relevant to energy management in the built environment. The influence of architectural aspects is presented and analysed. The concept of environmental building assessment is presented together with assessment schemes and tools commercially available. Occupant behaviour is discussed as relevant to the possibilities of enhancing energy efficiency. A study visit to a relevant site/facility is arranged.

Course literature

Handouts distributed during lectures.

Examination

- INL1 - Assignment, 3.0 credits, grading scale: P, F
- FÄL1 - Field Trip, 0.0 credits, grading scale: P, F
- TEN1 - Written exam, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 0.0 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.

Other requirements for final grade

Two project assignments (PROJ1, 4,5cr), (PROJ2; 1,5cr).

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.