MJ2437 Modeling of Energy Systems - Energy Utilization 6.0 credits

Modellering av energisystem - energianvändning

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

Establishment

On 15/102019, the Dean of the ITM School has decided to establish this official course syllabus to apply from spring term 2020 (registration number M-2019-1352).

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

After the course, the students should be able to:

- develop a model of an existing building in Stockholm in a commercially available energy calculation software with a focus on building geometry, system configurations and control strategies
- propose and analyse different energy efficiency measures for the existing building in Stockholm, to reach the Swedish criteria for near zero energy buildings (NZEB) according to the building regulations of the National Board of Housing, Building and Planning.
- carry out a cost-benefit analysis and evaluate environmental impact from the different energy efficiency measures that have been proposed for the existing building in Stockholm.
- compare and discuss the most advantageous energy systems for the building in Stockholm.
- propose, study and discuss different energy saving measures for an equivalent building in another country to reach the energy requirements that are in the local building regulations of the chosen country, with a focus on indoor climate, costs and environmental impact .
- clearly and logically present the project in a report and in the final review

Course contents

Buildings are complex systems there different factors as climate, the properties of the building, energy systems, individuals, illumination, equipment etc interact. An energy calculation software is necessary to be able to analyse and assess the effect of the different factors that influence the energy use in buildings. There are several energy calculation softwares for buildings that have become important tools to help architects and engineers to analyse energy use, indoor climate, environmental impact and costs in buildings but also to evaluate the energy use in different environmental certification methods and building regulations.

Examination

- SEM1 - Seminars, 0.0 credits, grading scale: P, F
- PRO1 - Project, 6.0 credits, grading scale: A, B, C, D, E, FX, 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.

Project (6.0 credits): Study and evaluate different energy efficiency measures for a building in Stockholm and one in the student's country. Achieve the Swedish criteria for near zero

energy buildings (NZEB) for the building in Stockholm. A grade (A-F) is assigned per group. Seminars (0.0 credits): Active participation in the seminars. A grade (A-F) is assigned per individual.

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.