AF2512 Indoor Climate and Energy Modeling for High Performance Buildings, Project Course 7.5 credits

Inomhusklimat- och energimodellering för högpresterande byggnader, projektkurs

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

Establishment

Course syllabus for AF2512 valid from Autumn 2020

Grading scale

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

Education cycle

Second cycle

Main field of study

The Built Environment

Specific prerequisites

AF1402 Building Physics, AF1002 Buildings and Civil Engineering Structures, AF2508 Building Service Technologies and Systems or equivalent courses.

Language of instruction

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

Intended learning outcomes

The main objective of the course is to provide good basic proficiency in indoor climate and energy modelling in buildings, as well as an understanding of the building as system.

On completion of the course, students are expected:

- Have a good understanding of parameters influencing the indoor climate and energy performance of buildings.
- Be able to use the simulation tool IDA ICE for simulating and evaluating the indoor climate and energy performance of buildings.
- Have a good understanding of the possibilities and constraints in building simulation.
- Be able to use the simulation tool IDA ICE for designing building service and energy systems for new and retrofitted buildings.
- Be able to carry out system studies of the thermal properties of buildings, air movements in buildings as well as climate control technologies.
- Analyse the function and the energy efficiency of climate control technologies.
- Analyse and describe the indoor climate and energy performance of buildings in a system perspective.

Course contents

- Simulating the indoor climate and energy performance of buildings in the context of new construction or building retrofitting.
- Possibilities and constraints in simulating the indoor climate and energy performance of buildings
- Advantages o weaknesses at different simulation tools.
- Calculus and interpretation of simulation results.
- Neutral Model Shaped (NMF).
- Simulating and evaluating (by means of the simulation tool IDA ICE) the indoor climate and energy performance of buildings at component and system level.
- Simulating the indoor climate and energy performance of buildings in the context of designing high-performance buildings (passive, near-zero-energy and positive energy buildings).
- Simulation/evaluation of measures for improved indoor climate and improvement of energy efficiency at modification/renovation.

- Methods for visualising simulated and measured indoor climate and energy performance of buildings.

Examination

- ÖVN1 - Project Assignment, 6.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Exam, 1.5 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.

The main goal of the project is to evaluate the possibilities of converting an existing building into a high-performance building (passive, near-zero-energy and positive energy buildings) by means of simulating/analysing indoor climate quality and energy performance.

The course is carried out in close cooperation with Equa Simulation LTD. Simulation tools: the latest version of IDA ICE; free licences are provided to all course participants.

Other requirements for final grade

Passed components PRO1 and TEN1

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.