HALMSTAD UNIVERSITY
Phone +46 35 16 71 00 - www.hh.se
School of Business, Innovation and Sustainability

Energy Efficiency and Moisture Control in Buildings 7.5 credits

Energieffektivisering och fuktsäkerhet i byggnader 7.5 hp

Second cycle
Main field: Construction Engineering with Specialisation in Renewable Energy, Second cycle, has only first-cycle course/s as entry requirements (A1N)

Syllabus is adopted by the Research and Education Board (2024-03-05) and is valid for students admitted for the autumn semester 2024.

Placement in the Academic System

The course is included in (Master's programme (120 credits) in Energy Smart Innovation in the Built Environment.

Prerequisites and Conditions of Admission

Bachelor's degree in Building Technology, Energy Engineering, Mechanical Engineering. Including courses of 7.5 credits within the field of Building Technology, 7.5 credits Applied Physics or the equivalent, and 22.5 credits Mathematics. The degree must be equivalent to a Swedish högskoleingenjörsexamen and must have been awarded from an internationally recognised university. English 6. Exemption of the requirement in Swedish is granted.

Course Objectives

The aim of the course is for the student to acquire knowledge of sustainable building technology and principles for energy efficiency. The aim of the course is also that the student acquires knowledge of how to design both new and older buildings to meet the requirements with regards to energy efficiency, moisture protection and healthy buildings based on course literature and current research within the field.

Following successful completion of the course the student should be able to:

Knowledge and understanding

- account for possible problems occurring in a building regarding to both indoor and outdoor climate
- account for current research and development with in the field of energy efficiency and moisture protection in buildings
- sescribe what consequences the indoor- and outdoor climate can have in a building and propose technical solutions to achieve energy efficient and moisture protected building

Skills and ability

- perform mathematical calculations regarding temperature- and moisture distribution in building components and assess the results obtained
- independently perform energy balances and carry out energy calculations
- critically and systematically use knowledge from technical/scientific literature

Judgement and approach

- methodically assess and evaluate a buildings strengths and weaknesses regarding energy efficiency and moisture safety
- critically analyze the energy efficiency from a societal perspective to get a long-term sustainable development
- evaluate and identify the own need for additional knowledge

Primary Contents

The course deals with building technology, dimensioning of building physics of construction parts regarding moisture and heat transfer, calculation and assessment of moisture and moisture damage, and of energy balance to meet the requirements for low energy buildings and high moisture safety. Reviews on operational requisites and climate strain.

Teaching Formats

The teaching consists of lectures, calculation exercises and design assignment.

Teaching is in English.

Examination

The overall grades of F (Insufficient), E (Sufficient), D (Satisfactory), C (Good), B (Very Good), A (Excellent) will be awarded for the course.
Examination takes place partly through a written individual exam and partly through a project work written in a group,

examination is assessed individually.

Name of the test		Grading
Written Examination	4,5 credits	F/E/D/C/B/A
Project Work	3 credits	U/G

If there are special reasons, the examiner may make exceptions from the specified examination format and allow a student to be examined in another way. Special reasons can e.g. be a decision on learning support.

For elite sports students according to Riktlinjer för kombinationen studier och elitidrott vid Högskolan i Halmstad, DNR: L 2018/177, the examiner has the right to decide on an adapted examination component or let the student complete the examination in an alternative way.

Course Evaluation

Course evaluation is part of the course. This evaluation should offer guidance in the future development and planning of the course. Course evaluations should be documented and made available to the students.

Course Literature and Other Study Resources

Pinteric, Marko. *Building Physics; From physical principles to international standards*. Latest version

Pinteric, Marko. *Problems in Building Physics*. Springer. Senaste upplaga

Additional handouts will be given.

Reference literature
Abel, Enno & Elmroth, Arne. *Buildings and Energy- a systematic approach*. Formas