



COURSE SYLLABUS

Energy and Building Services Engineering, 6 credits

Energi- och installationsteknik, 6 högskolepoäng

Course Code: TEIN19	Education Cycle: First-cycle level
Confirmed by: Dean Jun 1, 2019	Disciplinary domain: Technology
Valid From: Aug 1, 2019	Subject group: BY1
Version: 1	Specialised in: G2F
	Main field of study: Civil Engineering

Intended Learning Outcomes (ILO)

After a successful course, the student shall

Knowledge and understanding

- display knowledge of the building as an energy system and how it can be controlled to support a sustainable development
- display knowledge and understanding of the energy balance of the building
- display knowledge of different types of technical systems (electricity, heat, ventilation and sanitation) in buildings

Skills and abilities

- demonstrate the ability to calculate and design the building envelope and services according to standard requirements and criteria for low-energy buildings

Judgement and approach

- demonstrate the ability to evaluate the building with its energy and technical installation systems from a sustainable development perspective, including ecological, social and economic aspects

Contents

A survey course about different building services and how these in interaction with the building envelope affect the energy balance of the building.

The course includes the following elements:

- Thermal physics and its technical requirements and standards required in the structures of the building envelope.
- Thermal indoor climate and thermal comfort.
- Regulations and regulatory requirements.
- Air treatment with, ventilation needs, air quality, different ventilation systems, fire safety and ventilation, heat recovery and ventilation efficiency.
- Heat production and heat sources, heating technology, various heating systems.

- Sanitation engineering with technical systems for drinking water, wastewater and stormwater
- Electrical engineering with electrical services, electrical safety, artificial lightning.
- Solar cells and solar heat.
- Renewable energy.
- Energy balance of the building.
- Environmental certification of buildings.
- Low-energy buildings.
- Technical drawings with symbols and designations for plumbing and electrical systems.
- Space requirements for technical systems in buildings connected to technology and work environment.

Type of instruction

Lectures, exercises and study visit.

The teaching is conducted in English.

Prerequisites

General entry requirements and completed courses 60 credits in first cycle including the courses Building Materials and Building Technology 2, 6 credits and BIM 2 Analysis and Simulation - Architectural Engineering, 6 credits or BIM 2 Analysis and Structural Design - Construction Engineering, 6 credits (or the equivalent).

Examination and grades

The course is graded 5,4,3 or Fail.

Registration of examination:

Name of the Test	Value	Grading
Examination ¹	3 credits	5/4/3/U
Project work	3 credits	U/G

¹ Determines the final grade of the course, which is issued only when all course units have been passed.

Course literature

The literature list for the course will be provided one month before the course starts.

Title: Building Services Design for Energy Efficient Buildings

Author: Tymkow, P. Tassou, S. Koloktroni, M & Jouhara, H. (2013)

Publisher: Routledge, London. ISBN: 9780415596374.

(Also available as pdf to download).