

*Course syllabus*

# **Livscykelperspektiv och miljöbedömning av byggnader Life Cycle Perspective and Environmental Impact of Buildings**

**ABKN05, 7,5 credits, A (Second Cycle)**

**Valid for:** 2023/24

**Faculty:** Faculty of Engineering, LTH

**Decided by:** PLED V

**Date of Decision:** 2023-03-21

## **General Information**

**Main field:** Energy-efficient and Environmental Buildings.

**Compulsory for:** MEMB2

**Language of instruction:** The course will be given in English

## **Aim**

At the end of this course, the student will:

- be aware of basic life cycle methods as well as tools for evaluating environmental impact and making classifications of buildings;
- have knowledge of the LCC analysis concept and how it can be used for optimisation;
- have understanding of the LCA concept;
- have knowledge of major environmental certification systems for buildings;
- understand and be able to discuss different actors' needs and goals

## **Learning outcomes**

### *Knowledge and understanding*

For a passing grade the student must

- be able to describe and discuss the important concepts and key issues related to LCC-analyses, LCAs and environmental certification;
- be able to describe and discuss input parameters and their link to decision making;

- understand the influence of system boundaries and cost allocation
- know typical good solutions from different perspectives

#### *Competences and skills*

For a passing grade the student must

- be able to perform an LCC analysis on both a new built and a renovation project;
- be able to initiate an LCA;
- be able to perform an environmental certification of a building;
- easily interpret LCC analyses, LCAs and environmental certification;
- be able to inform (his/her client) and articulate adequate discussions regarding costs and life cycle perspectives;
- be able to discuss wisely important parameters used for the life cycle perspective;

#### *Judgement and approach*

For a passing grade the student must

- be able to influence design decisions using facts and knowledge;
- be able to formulate relevant research and/or consulting questions and tasks in connection life cycle perspective and environmental issues in buildings;
- be able to discuss the importance and problems using life cycle perspectives and sustainable approach; thinking

## Contents

This course will provide knowledge and understanding about how cost and environmental issues affect the choice of design solutions and which measures need a longer term perspective than others, in order to get back the investment costs or make the building sustainable. This course will also provide knowledge and understanding related to different types of actors' interests (city-owned property owners, private property owners, property developers (build and sell), private home owners, builders, manufacturers etc). Also included will be aspects of barriers and possibilities. The course presents methodology and tools for determining life cycle perspective issues like life-cycle costs and environmental certification. This can be used for evaluation, system design and to produce convincing arguments and facts for the client.

## Examination details

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)

**Assessment:** The final grade is to 70% based on the written examination and to 30% on the performance related to the exercises and lectures.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

#### **Parts**

**Code:** 0123. **Name:** Exercise.

**Credits:** 3. **Grading scale:** UG. **Assessment:** Examination based on written report according to given criteria. **Contents:** LCC analysis Environmental certification

**Code:** 0223. **Name:** Written Examination.

**Credits:** 4,5. **Grading scale:** TH. **Assessment:** Examination based on the written examination. **Contents:** Written examination of the whole course.

## Admission

**The number of participants is limited to:** No

**The course overlaps following course/s:** ABKF15

## Reading list

- American Institute of Architects (AIA): AIA Guide to Building Life Cycle Assessment in Practice. 2010.
- Mohamad Monkiz Khasreen, Phillip F.G. Banfill and Gillian F. Menzies: Life-Cycle Assessment and the Environmental Impact of Buildings: A Review. MDPI - Open Access Publishing, 2009. Journal of Sustainability, 1, 674-701.
- Lecture slides, recent papers and other material distributed through the course web page.
- IVL: Economic and environmental impact assessment of very low-energy house concepts in the North European countries. 2011.
- Sartori, I. & Hestnes, A.: Energy use in the life cycle of conventional and low-energy buildings: A review article. Elsevier, 2007. Energy and Buildings 39, p. 249–257.

## Contact and other information

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