



# AF2507 Sustainable Buildings - Concept, Design, Construction and Operation 7.5 credits

Hållbara byggnader - design, bygg och drift

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Course syllabus for AF2507 valid from Autumn 13

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

**Grading scale:** A, B, C, D, E, FX, F

**Education cycle:** Second cycle

**Main field of study:** Built Environment

## Intended learning outcomes

Upon successfully completing this course, students should be able to:

Understand the principles of triple-bottom-line based sustainable building design and actively participate in the complex iterative and multidisciplinary process of conceptualizing and designing a high-performance building (low-emissions, low resource-consumption, small environmental footprint),

Choose and size building components, as well as energy and environmental systems suitable for different categories of high-performance buildings, and different climate zones, such as to achieve the smallest feasible life-time environmental impact,

Utilize a variety of tools and methodologies suitable for evaluating the resource efficiency and overall environmental performance (environmental footprint) of buildings in different stages of their life cycles,

Have a good understanding of key regulatory tools, including building codes, design guidelines, as well as relevant legislation governing the consumption of resources and emission of environmental pollutants by buildings.

## Course main content

This course deals in detail with the concepts, methodologies/tools and processes required for designing, building and operating sustainable buildings, and evaluating their resource-efficiency (e.g. energy- and water-efficiency), as well as environmental and socio-economic performance in various stages of their operation and overall lifecycle. The sustainable performance of buildings is thus addressed in a holistic triple-bottom-line approach, based on environmental, economic and social/behavioural criteria relevant to different phases of the building lifecycle.

Bioclimatic and other aspects of high-performance building design (passive, zero-energy and positive energy buildings), as well as the utilization of renewable and locally available resources (energy, water) and technologies are discussed in detail.

Building systems and services (such as thermal comfort, indoor air quality, lighting etc.) are discussed in an integrated system perspective, as relevant to the sustainable performance of singular buildings, as well as building clusters, precincts and cities.

State-of-the-art modeling tools (energy-modeling, BIM, etc) are presented and used in designing/evaluating different types of high-performance buildings.

Lectures given by experts from a number of related disciplines (architecture, building physics, energy technology, building information management (BIM), environmental management, real-estate economy) are designed to offer a solid understanding of integrated sustainable building design principles. Additional in-depth studies are carried out in the form of an assignment/project carried out in an area of specific interest to the student

Field trips include visits to a number of high-performance buildings and urban districts.

## **Language of instruction**

Language of instruction is specified in the course offering information in the course and programme directory.

## **Eligibility**

Bachelor exam "Samhällsbyggnad" or equivalent, e.g. "högskoleingenjör" in House Construction;

Equivalence to be established on a case-to-case basis for exchange and international students

## **Literature**

Handouts samt aktuell facklitteratur (meddelas vid kursstart).

## **Examination**

- PRO1 - Project, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F

## **Requirements for final grade**

PRO1 - Project: 4,5 ECTS; Grade scale A-F

TEN1 - Written Exam: 3 ECTS; Grade scale A-F