



# AF1002 Buildings and Civil Engineering Structures 7.5 credits

## Hus och anläggningar

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

### Establishment

Course syllabus for AF1002 valid from Spring 2024

### Grading scale

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

### Education cycle

First cycle

### Main field of study

Technology

### Specific prerequisites

AI1527 Introduction to the Planning and Building Process,

AL1302 Geoscience and Geotechnical Engineering

Minimum 3 ECTS from SG1117 Engineering Mechanics and minimum 2,5 ECTS from AI1802 Project Management and BIM in the Built Environment.

### Language of instruction

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

## Intended learning outcomes

After completing the course the student should be able to:

- Describe the purpose and function of the parts of a building considering the load carrying structure, building technology, service systems, and energy systems.
- Explain key concepts and principles within structural analysis, building technology, service and energy systems, and thereby understand and analyse simplified engineering problems.
- Apply analysis methods to make preliminary estimations of the load effect to determine the structural capacity, the thermo-technical properties of the building envelope, and the energy needs of a building.
- Perform a superficial inspection of an existing structure including drawings and technical documents to describe its design and technical properties.
- Make suggestions on rebuilding and identify risks with a different use.
- Prove an understanding of how technical issues influence the sustainability in construction considering natural resources, health and quality of life.

## Course contents

The course gives an introduction to the modern construction and architectural history. From a technical perspective, the development until today's buildings and structures is reviewed.

Key concepts in structural analysis, building technology, service systems and energy systems are introduced as a basis to enable interpretations of technical documents within these fields.

Within structural analysis, frequently occurring structures and foundations for buildings and bridges are treated. Attention is put on loads, their origin and how they should be combined in the design calculations of the load carrying structure.

Within building technology, concepts and principles on the technical properties of the building envelope is treated such as temperature and vapour distribution, thermal bridges and the risk of moisture damages. Counteractions for problems in existing buildings are discussed.

The part about service and energy systems deals with important technical systems for heating and ventilation. An introduction to calculation of energy consumption and cost is also given related to rebuilding and extension.

Issues related to sustainability are treated in all technical disciplines. Some examples are choice of material, design optimization against cost and use of resources, serviceability criteria, availability, indoor climate and energy consumption.

## Examination

- ÖVN1 - Exercises, 1.5 credits, grading scale: P, F

- PRO1 - Project Work, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 3.0 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 examination in this course is divided into three parts, a written exam, mandatory assignments and a project carried out in groups of three to four students.

Assessment criteria are announced when the course starts.

## Other requirements for final grade

Written exam (TEN1, 3 hp)

Project task (PRO1; 3hp)

Exercises (ÖVN1 1,5 hp)

## 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.