



# AF2003 Structural Engineering, Advanced Course 7.5 credits

Bärverksanalys, avancerad kurs

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

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for AF2003 valid from Autumn 2010

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Built Environment

## Language of instruction

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

## Intended learning outcomes

The main goal of the course is to give deepened knowledge for the analysis and design of civil structures with special reference to load bearing resistance. After having passed the course the student should be able to:

- Calculate the distribution of bending moments, shear and normal forces for statically indeterminate beams and frames within the elastic range.
- Analyse beams in torsion according to Saint-Venant theory.
- Calculate the distribution of bending and torsional moments in planar grid structures. (3D slope deflection theory).
- Explain buckling and flexural buckling of columns and column systems.
- Explain serviceability and ultimate limit states for under-, balanced and over-reinforced, concrete sections in bending, axial force and combinations of loads.
- Explain the ultimate load analysis methodology for concrete beams in shear.

## Course contents

- Statically indeterminate beams and 2D frames.
- Torsion of beams
- Grids and other horizontal frame structures (3D frames analysed by slope deflection theory)
- Buckling of columns and systems of columns.
- Design of beams, columns and frames of reinforced concrete with special reference to bending, shear and instability.

## Disposition

- Lectures 33 hours
- Exercise classes 44 hours
- Exam 4 hours

## Specific prerequisites

Basic knowledge in structural mechanics and structural engineering. Equivalent to at least 2-times 7,5 ECTS points.

## Course literature

Course Literature: excerpts from reports issued by the division of Structural design and bridges:

Report 109: Beam and Frame Structures

Report 115: Reinforced Concrete Structures

Report 119: Torsion of Concrete Beams

Report 130: Structural and Bridge Design Exercises

## Examination

- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Exercises, 3.0 credits, grading scale: P, 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.

## Other requirements for final grade

Passed written exam (4,5 ECTS credits)

Passed exercises (3 ECTS credits)

## 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.