AF2102 Concrete Structures, Advanced Course 7.5 credits

Betongbyggnad, fortsättningskurs

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

Establishment

Course syllabus for AF2102 valid from Autumn 2024

Grading scale

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

Education cycle

Second cycle

Main field of study

The Built Environment

Specific prerequisites

Documented knowledge in Structural Mechanics, Structural Engineering and Concrete Structures equivalent to at least 22,5 ECTS corresponding to the content in courses AF1006, AF1005, AF2003 and at least 3 ECTS from AF2101.

Eng B/6 according to the Swedish upper secondary school system.

Language of instruction

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

Intended learning outcomes

After having passed the course the student should be able to:

• Explain the principles for concrete frame systems.

• Design reinforced concrete structures in the serviceability stage.

• Explain the theoretical background of fracture mechanics implemented for concrete.

• Design reinforced concrete beams using the finite element method.

• Explain the causes of cracking of newly cast, massive concrete structures and be able to asses the risk of crack formation and to recommend actions for crack reduction.

• Design concrete structures with respect to material properties and durability.

• Explain cracking strength, residual strength, ductility index and the residual strength factor.

• Explain the modes of action of bonding shotcrete, rock anchored shotcrete and shotcrete arches.

• Calculate the load bearing resistance of bonding shotcrete and rock anchored shotcrete in some simple cases.

Course contents

• Concrete frame systems.

• Serviceability state and deformations

• Massive concrete structures

• Concrete materials

• Fiber reinforced concrete

• Shotcrete (sprayed concrete)

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Finite element modelling of concrete structures

Examination

• ÖVN1 - Exercises, 3.0 credits, grading scale: P, F

- TEN1 - Examination, 4.5 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.

Other requirements for final grade

All parts need to be passed

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.