



AF2102 Concrete Structures, Advanced Course 7.5 credits

Betongbyggnad, fortsättningskurs

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 AF2102 valid from Spring 2018

Grading scale

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

Education cycle

Second cycle

Main field of study

Built Environment

Specific prerequisites

For students not registered on a KTH programme:

120 university credits (hp) including courses in Structural Mechanics and Structural Engineering equivalent to at least 4-times 7,5 ECTS points. And documented proficiency in English corresponding to English B.

For students registered on a KTH-programme:

SG1801 Structural Mechanics, Basic Course

AF1005 Structural Engineering, Basic Course

AF2003 Structural Engineering, Advanced Course

AF2101 Concrete Structures

or equivalent courses

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 assess 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

Course literature

- 1) Serviceability state - Ansell
- 2) Temperature cracks in newly cast concrete structures - Ansell
- 3) Deflection of concrete beams - Ansell
- 4) Crack control - Ansell
- 5) Steel fibre concrete – Holmgren, Silfwerbrand
- 6) Non-linear analyses of concrete beams with Abaqus - Malm
- 7) Shotcrete-Sprayed concrete - Holmgren
- 8) Concrete for hydropower - Nordström
- 9) Slabs-on-grade for roads, industrial floors, and foundations– Silfwerbrand, Sundquist

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.

TEN1 - Examination 4.5 credits, grade scale A-F

ÖVN1 - Exercises 3.0 credits, grade scale P,F

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.