



*Course syllabus*

# Betongbyggnad Concrete Structures

**VBKN05, 7,5 credits, A (Second Cycle)**

**Valid for:** 2023/24

**Faculty:** Faculty of Engineering, LTH

**Decided by:** PLED V

**Date of Decision:** 2023-03-21

## General Information

**Elective for:** V4-hb, V4-at, V4-ko

**Language of instruction:** The course will be given in English on demand

## Aim

The course develops understanding of the mechanical behaviour of and skills in designing reinforced concrete structures.

## Learning outcomes

*Knowledge and understanding*

For a passing grade the student must

- Understand mechanical response of concrete structures with plain and pre-stressed reinforcement throughout their entire expected life-time
- Be able to relate relevant theories from the field of mechanics and materials science to practice oriented applications involving reinforced concrete

*Competences and skills*

For a passing grade the student must

- Be able to design reinforced concrete structural elements and details

- Departing from specific functional requirements be able to model adequate load bearing concrete structures
- Departing from available information and acquired knowledge be able to assess technical condition of existing buildings
- Be able to deliver written accounts concerning the premises for a design or technical assessment task
- Be able to produce written and graphical documentation for a design or technical assessment task

#### *Judgement and approach*

For a passing grade the student must

- Be able to relate critically to different calculation and design methods in the field of concrete design
- Be able to develop new calculation or design models

## Contents

- Flexural analysis of beams
- Shear analysis and torsion of beams
- Bond and anchorage of reinforcement
- Deformation and crack control
- Columns and walls
- Slabs
- Foundations and floor constructions
- Deep beams and shear walls
- Repair and reinforcement methods
- Detailing
- Prestressed concrete
- Strut-and-tie models

The course is given as lectures and exercises. The assignment trains students to independently define, solve and present problems from the field of concrete construction.

## Examination details

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)

**Assessment:** Written examination and two assignments. The written exam consists of two parts one theoretical part and one with focus on calculations.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

#### **Parts**

**Code:** 0112. **Name:** Concrete Structures.

**Credits:** 5. **Grading scale:** TH. **Assessment:** Examination

**Code:** 0212. **Name:** Projekt Assignments.

**Credits:** 2,5. **Grading scale:** UG. **Assessment:** Project Assignments. For written assignments, not only the correctness of calculations and results is assessed, but also the quality of the presentation, i.e. structure and descriptive texts of the report.

# Admission

## Admission requirements:

- VBK013 Structural Engineering, Basic Course or VBKF15 Structural Engineering

**The number of participants is limited to:** No

**The course overlaps following course/s:** VBK020

## Reading list

- Engström B.: Kompendium i betongkonstruktioner. Chalmers Tekniska Högskola , 2005.
- Engström, B.: Design and analysis of deep beams, plates and other discontinuity regions. Chalmers Tekniska Högskola , 2011.
- Engström B.: Design and analysis of prestressed concrete structures. Chalmers Tekniska Högskola , 2011.
- Bhatt, MacGinley, Choo: Reinforced Concrete Design to Eurocodes: Design Theory and Examples. CRC Press, 2014, ISBN: 9781466552524.

## Contact and other information

**Course coordinator:** Miklós Molnár, miklos.molnar@kstr.lth.se

**Course coordinator:** Mohammad Kahangi, mohammad.kahangi@kstr.lth.se

**Course homepage:** <https://canvas.education.lu.se/>

**Further information:** Course homepage at Canvas. All registered students have access to the course homepage.