

**SYLLABUS**

# **Concrete Structures 7.5 credits K7002B**

**Betongkonstruktioner**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

**DECISION DATE  
2021-02-17**

# Concrete Structures 7.5 credits K7002B

## Betongkonstruktioner

### Second cycle, K7002B

**Education level**  
Second cycle

**Grade scale**  
G U 3 4 5

**Subject**  
Konstruktionsteknik

**Subject group (SCB)**  
Building Technology

## Entry requirements

Structural engineering I and II or corresponding.

## Selection

The selection is based on 30-285 credits

## Course Aim

At the end of this course, the student should be able to:

1. Define the design methods of beams, columns and slabs
2. Define and explain the meaning of different technical terms used in structural design of concrete elements
3. Compute (design in engineering terms) concrete slabs, beams and columns based on Eurocode regulations including detailing of reinforcement, and technical drawings
4. Explain the meaning of the equations used for designing the above structural elements
5. Judge optimum reinforcement design

## Contents

The course is organized in modules, A and B, and sub-parts according to:

- A. Concrete beams and columns
- B. Concrete slabs

Module A – constitutes a continuation and further development of your knowledge gained in previous courses, related to bending, combined normal force and bending, fatigue, shear and torsion. The detailing part of the concrete structural elements will be addressed through studies and work with Eurocodes.

Module B – contains knowledge about both the background and design procedures according to: theory of elasticity, the strip method, yield line theory, standard method.

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

This course includes teaching and learning activities such as lectures, seminars, project assignments, group work, laboratory testing and quizzes.

### Lectures

The teacher will present the topic of the day of each lecture. With most occasions you will need to prepare ahead of the lecture. You will have to reading from the course literature the chapters indicated by the teacher. You will have to formulate and answer to the questions the teacher will present to you during or ahead of the lecture. Some of these questions will be given at the exam. This process will address ILO's 1 and 2 (see above).

### Seminars

During these seminars, the teacher will present examples of applied theory and design methods, and the students will also work individually with examples. The teacher will assist them during this time and give feedback on the student's work. This will be the best opportunity to ask the teacher if you follow the right path and ask for advices when you encountered difficulties related to the Project assignments (see below). This process will address ILO's 3 and 4 (see above).

### Project assignments

During this course you will solve two project assignments. Assignment 1 consists of designing a concrete structural element such as a beam or column and can be solved in groups of two students or individually by each student.

Assignment 2 consist of designing slabs with different methods and can only be solved individually. Data for the assignments are given in a list of parameters for each task different from year to year. The assignments should be reported in a written paper in English based on a predefined template

The two project assignments are presented in separate documents in Canvas. This process will address ILO's 4 and 5 (see above).

### Laboratory task and group work

With support from a laboratory technician, students will test a slab. For the laboratory task you will work in groups of 4-6 persons. You can choose your group in Canvas.

During the test you will measure the cracks, map them and record the loads. You will write a report based on these observations and you will present a comparison between theory calculations and the results from the tests. A description of the laboratory task and the template is available on Canvas. This process will address ILO's 3 and 4 (see above).

### Quizzes

The first quiz will open before we meet in Canvas or during our first lecture and serves as an evaluation form of your prior knowledge. The role of this quiz is to let us teachers understand what your level of knowledge at the course start is. The results will allow us to adjust the content of the course so that the intended learning outcomes will be reached.

The final quiz will be available after all theory lectures will be presented and approximately one to two weeks before the oral exam (depending on the Easter vacation). The quiz will consist of theory question with single, multiple answers and explanation with focus on outcomes 1-3. Quizzes will be available in Canvas.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

The outcomes of the course are assessed through oral examination. This will be carried out in form of presentation of (1) discussion of the quiz results where different questions will be discussed and analysed and (2) the project assignments and laboratory test reports). With the first form of examination, it is intended to assess outcomes 1-3 while with the second outcomes 4 and 5. The examination will take about 30-60 minutes for each student.

Projects Assignments 1 and 2 and laboratory report must be submitted, corrected and approved prior to exam. It is a precondition to enter exam. All moments of the course are mandatory.

Grading scale G/U 3 4 5 will be used.

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term “unauthorized aids” refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Overlap

The course K7002B is equal to ABK123

## Course offered by

Department of Civil, Environmental and Natural Resources Engineering

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0004	Oral exam	G U 3 4 5	3	Mandatory	A21	
0005	Project assignments	U G#	3	Mandatory	A21	
0006	Laboratory reports	U G#	1.5	Mandatory	A21	

## Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

## Last revised

by Assistant Director of Undergraduate Studies Eva Gunneriusson, Department of Civil, Environmental and Natural Resources Engineering 2021-02-17

## Syllabus established

The plan is established by the Department of Civil and Environmental Engineering 2007-01-31 and is valid from H07.