



Faculty of Health, Science and Technology
Construction Engineering

Syllabus

Engineering Designs: Reinforced Concrete Structures

Course Code:	BYGC11
Course Title:	Engineering Designs: Reinforced Concrete Structures <i>Betongkonstruktion</i>
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:
BYA (Building Technology)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2021-11-08, and is valid from the Spring semester 2022 at Karlstad University.

Prerequisites

Steel Structures (7.5 ECTS credits) or Structural Mechanics - statically undetermined constructions (2 ECTS credits), or equivalent

Learning Outcomes

The course is an elective in the third year of the Building and Construction Engineering programme. Students learn to design and dimension simple concrete structures. The aim of the course is for students to acquire basic knowledge of concrete structures and the ability to design and dimension concrete construction elements.

Upon completion of the course, for a grade of Pass (3), students should be able to:

- dimension single and double reinforced cross sections regarding bending moment and the combination of bending moment and longitudinal force,
- check cross sections regarding capacity with respect to shear force,

- calculate resistance in columns under centric pressure,
- calculate stress in serviceability limit state I, and
- calculate moment in framework slabs.

In addition, students should be able to structure, perform, and document the design of a building according to common standards.

Upon completion of the course, for a grade of Distinction (4 or 5), students should be able to:

- dimension shearing force reinforcement,
- dimension columns and walls with respect to pressure,
- calculate stress in serviceability limit state II,
- calculate moment and reinforcement in continuous framework slabs, and
- demonstrate understanding through giving an account of the calculations and checks required in the dimensioning of a structure, and be able to apply the knowledge.

Content

The course covers:

- concrete and reinforcement interaction, properties of materials
- non-dimensional quantities
- single and double reinforced sections exposed to moment or a combination of moment and longitudinal force
- capacity with respect to shear force
- dimensioning of columns and walls exposed to pressure
- serviceability limit states I and II
- moment and reinforcement in framework slabs
- information of T-girders, truncation of reinforcing bars, arranging reinforcement, reinforcement specification, presentation of concrete structures
- laboratory work including reinforcement, casting, testing, and calculation of crack and fracture moment.

Instruction is in the form of lectures, calculation exercises, and two mandatory laboratory sessions carried out in groups. There is also a mandatory, individual design assignment.

Reading List

See separate document.

Examination

Assessment for the grade of Pass (3) is continuous. Grades are awarded on the basis of individual written exams, a written lab report, and a written design assignment completed in groups. Students who want to earn a grade of Distinction (4 and 5) sit an exam at the end of the course, and an opportunity to re-sit for a Pass grade is also provided. Attendance is mandatory for laboratory sessions and the final assessment of the design assignment.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades

One of the grades Pass with Distinction (5), Pass with Some Distinction (4), Pass (3), or Fail (U) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course

evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.