Faculty of Health, Science and Technology
Construction Engineering

Syllabus

Engineering Designs: Reinforced Concrete Structures

Course Code:	BYGC11
Course Title:	Engineering Designs: Reinforced Concrete Structures *Betongkonstruktion*
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 2015-02-18, and is valid from the Autumn semester 2015 at Karlstad University.

Prerequisites
Engineering Design: Steel Structures 7.5 ECTS cr. or equivalent.

Learning Outcomes
The course is an elective in the third year of the Building and Construction Engineering programme. Students learn to design simple concrete structures.
Upon completion of the course the students should be able to:
- demonstrate basic knowledge of concrete structures
- design and dimension concrete structures

To earn a Pass grade students should satisfactorily be able to:
- design single and double reinforced 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 serviceabilty limit state I
- 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.

To earn a grade of distinction, 4 and 5, students should also be able to:
- design shearing force reinforcement
- design columns and walls with respect to pressure
- calculate stress in serviceability limit state II

- calculate moment in continuous framework slabs
- demonstrate knowledge of the calculations and checks required in the design of a structure and apply the knowledge.

Content
The course comprises:
- 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
- design of columns and walls exposed to pressure
- serviceability limit states I and II
- moment 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
group laboratory experiments. There is also a mandatory, individual design assignment.

Reading List
See separate document.

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

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