



Faculty of Health, Science and Technology  
Construction Engineering

## Syllabus

### Engineering Design: Steel Structures

<b>Course Code:</b>	BYGB14
<b>Course Title:</b>	Engineering Design: Steel Structures <i>Stålkonstruktion</i>
<b>Credits:</b>	7.5
<b>Degree Level:</b>	Undergraduate level
<b>Progressive Specialisation:</b>	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: Timber Structures 7.5 ECTS cr or equivalent

#### Learning Outcomes

The course is an elective in the second year of the building and construction engineering programme. It is a design course in which students learn to design simple steel structures. The aim of the course is that students acquire skills in calculating statically indeterminate constructions, basic knowledge of structural elements of steel, and skills in designing steel structures.

For a Pass grade, students should be able to:

- use the elementary case method, displacement method and table formula for calculating load on statically indeterminate beams,
- use maximum moment diagram and lines of action,
- design beams and columns with regard to tensile and compressive force capacity,
- design beams with regard to bending moment and shear force capacity,
- design simple weld joints,
- design simple screw joints.

Students should also be able to plan, carry out and present the design of a building in accordance with codes and standard practice.

For a grade of Distinction (4 or 5), students should, in addition to the requirements above, be able to:

- use the displacement method with regard to calculating load on framework,
- design constructions with regard to combination of bending moment and normal force,
- design beams with regard to skewed bending,

- control beams with regard to concentrated load,
- design combined weld and skrew joints,
- demonstrate understanding of the field by knowing what calculations and controls are required in the design of a construction and demonstrate skills in applying the knowledge.

### **Content**

The course consists of:

- calculating load on statically indeterminate constructions,
- free action, maximum moment diagram, lines of action
- the properties of steel, rust and fire protection
- tensile and compressive force
- bending moment capacity
- axial force and bending moment
- skewed bending
- shear force capacity
- concentrated load and Web stiffeners
- deformation
- weld joints
- screw joints
- combined weld and screw joints
- information on framework details and presentation and controlling steel structures.

Instruction is in the form of lectures and calculation exercises. One design task is mandatory.

### **Reading List**

See separate document.

### **Examination**

Assessment for the Pass grade (3) is continuous throughout the course. Assessment is based on a written assignment and a written design task. For a grade of Distinction (4 or 5) students sit a written exam at the end of the course. Students who have failed to earn a Pass grade have a re-sit opportunity at the end of the course.

### **Grades**

One of the grades 5 (Distinction), 4 (Some Distinction), 3 Pass , 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.