



Faculty of Technology and Science  
Construction Engineering

## Syllabus

### Course Approval

The syllabus was approved by the Faculty Board of Technology and Science on 25 May 2007, and is valid from the Autumn semester of 2007 at Karlstad University.

**Course Code:** BYGB10

**Strength of Materials for Building Construction, 7.5 ECTS Credits  
(Hållfasthetslära för byggingenjörer, 7.5 Swedish credit points)**

**Degree Level:** Bachelor

**Progression Level:** B

### Language of Instruction

Swedish

### Prerequisites

Engineering work 15 ECTS cr., Mathematics for Engineers 15 ECTS cr., Structural Mechanics 7.5 ECTS cr., Building Technology and Building Physics 7.5 ECTS cr. or equivalent.

### Major Field of Study

Building Technology

## Aims

The course forms part of the second year of the Building and Construction Engineering programme. The aim is that students acquire the basic theoretical knowledge of strength of materials required for the applied construction courses in the programme. The students develop their ability to think theoretically and deal with basic theories, as well as their written and oral performance.

Upon completion of the course a Pass grade (3) is awarded to students who are able to:

- use general problem-solving methods and carry out dimensional analysis of the results,
- give an account of the calculation principles used in the thematic course components,
- give an account of the theoretical relationships applied in the thematic course components,
- correctly carry out simple calculations based on given conditions in all the thematic course components,
- describe performed laboratory work in a clearly written and structured group report, following the departmental standard model,
- in groups and within a given time-span orally present laboratory work to their fellow-students clearly and coherently using relevant aids.

Upon completion of the course a grade of distinction (4 or 5) is awarded to students who, in addition to the above, are able to:

- carry out more complex calculations based on assumed conditions,
- apply course theory when calculating problems unknown to the students
- apply combinations of theories when making calculations,
- carry out an individual project and, to their fellow-students, orally and in writing explain the theoretical relationships in the chosen area, with reference to a real case.

## Course Content

The course comprises weekly thematic components. Every theme includes a mandatory laboratory experiment performed in groups and presented orally and in writing. This is followed by lectures and calculation exercises. Every theme concludes with a written exam for the Pass grade level. The written exam

for the distinction grade levels takes place at the end of the course. Students aspiring to a distinction grade are also given the opportunity to carry out a seminar assignment.

Thematic components:

- Hooke's law: relation stress-strain in homogeneous and composite materials, ideal area, shrinkage and thermal stress.
- Bending stress: stress distribution in pure bending of homogeneous and composite materials, elastic section modulus, moment of inertia, normal bending, centre of mass calculation of composite materials, ideal moment of inertia, skew bending.
- Deflection: equation of elastic deflection curve, elementary case method.
- Shearing stress: distribution of shearing stress in cross-section, principal stress, Mohr's circle.
- Instability: lateral buckling, lateral instability and buckling.
- The strength values of norms: the construction of norms, the method of partial factors, characteristic and design values of material strength.

## Reading List

See separate document.

## Examination

Examination is continuous and in the form of lab reports, oral presentation and written exams. Each thematic component is concluded with a written exam at the Pass level. A final written exam is offered at the end of the course to students who aim for a grade of Distinction as is the opportunity to add an assignment for the higher grade.

## Grades

One of the grades Fail, 3 (Pass), 4 (Pass with some distinction), or 5 (Pass with Distinction) 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 assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

## Course Certificate

A course certificate will be provided upon request.

## Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

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

The course includes groupwork requiring students to be present beyond scheduled hours.

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