



## Course syllabus

Faculty of Technology

Department of Building Technology

1BY012 Byggnadsmekanik, 7,5 högskolepoäng

Structural Mechanics, 7.5 credits

### **Main field of study**

Civil Engineering

### **Subject Group**

Building Technology

### **Level of classification**

First Level

### **Progression**

G1F

### **Date of Ratification**

Approved 2009-12-15

Revised 2016-08-31 by Faculty of Technology. Review of prerequisites

The course syllabus is valid from autumn semester 2017

### **Prerequisites**

General entry requirements and Mathematics D, Physics B or Mathematics 3c, Physics 2 (Field-specific entry requirements 8/A8). Mechanics, 7,5 credits or equivalent alternatively at least 37,5 credits within an Engineering program where of at least 7,5 credits within mathematics.

## Objectives

After completing the course the student is expected to be able to:

- define and explain concepts within Structural Mechanics/Solid Mechanics
- identify suitable models and be aware of different assumptions made in connection to analyses of mechanical structures
- apply concepts and principles within Structural Mechanics/Solid Mechanics in order to calculate and present solutions to structural mechanics problems
- present results from laboratory work and assignments in written reports in a way that is generally expected from engineers

## Content

The course comprises the following elements:

- the concepts of stress and strain, including general stress states, principal stresses and measures of effective stresses
- section forces in beams, bars and axes exposed to different types of loading
- analyses of statically determinate and indeterminate beams
- analyses of statically determinate trusses
- stresses in beams exposed to bending and normal forces and axes exposed to torque

- the differential equation of the deflection curve describing beam deformation
- deformation of bars
- second order effects and instability
- linear elastic and elastic ideal-plastic material assumptions
- elastic and plastic moment capacity for beam sections.

### Type of Instruction

The teaching consists of lectures, laboratory work and exercises. Participation in one laboratory task/project is compulsory. An account of the work and the results shall be given in a written report following engineering standards.

### Examination

The course is assessed with the grades U,3,4 or 5.

The examination consists of two parts, the report of the laboratory work and a written examination. The report of the laboratory work (1 credit) is assessed as failed passed. The written examination (6,5 credits) is assessed with the grades U, 3, 4 or 5.

Both parts must be approved before the course is passed. The final grade is then given by the grade of the written examination.

### Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

### Credit Overlap

This course cannot be part of a degree in combination with another course in which the content fully or partly correspond to the content of this course: 1MT003

### Required Reading and Additional Study Material

#### **Required reading**

S. Heyden, O. Dahlblom, A. Olsson, G. Sandberg, *Introduktion till Strukturmekaniken*, Studentlitteratur, latest edition. 240 of 307 pages.