



Course syllabus

Faculty Board of Science and Engineering
School of Engineering

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 by the Board of the School of Engineering 2009-12-15

Revised 2012-05-29. Review of prerequisites.

The course syllabus is valid from autumn semester 2013

Prerequisites

General entry requirements and Mathematics D, Physics B or Mathematics 3c, Physics 2 (Field-specific entry requirements 8/A8). Mechanics, 7,5 hec or equivalent.

Objectives

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

- classify a truss by one of the following categories: mechanism, statically determinate or indeterminate, and calculate the internal forces appearing in a statically determinate truss
- account for and calculate the section-forces in a beam (both statically determinate and indeterminate) exposed to different types of in-plane loading
- calculate on the basis of section-forces normal and shear stresses in a mono-symmetric beam and in an axis subjected to torque
- calculate the deformations appearing in beams, bars and axes
- account for situations when instability phenomena may appear and calculate the critical load
- account for the linear-elastic and elastic-ideal-plastic material models and calculate elastic and plastic moment

capacity for a mono-symmetric beam section.

Content

The course comprises the following elements:

- the concepts of stress and strain
- 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
- bar deformation
- second-order effect 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 course laboratory work is compulsory.

Examination

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

On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

The assessment of student performances is generally written and takes place during special examination periods. The assessment may also be based on submitted presentations of laboratory work and assignments.

Course Evaluation

A written course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The course evaluation will be filed at the department.

Other

On request, a Swedish University course certificate will be awarded upon successful completion of the course.

Upon request, a Swedish University degree will be issued upon successful completion of the full demands for that degree.

Required Reading and Additional Study Material

Required reading

S. Heyden, O. Dahlblom, A. Olsson, G. Sandberg, *Introduktion till Strukturmekniken*, Studentlitteratur, 2008. 240/307 sidor.