



Course syllabus

Faculty Board of Science and Engineering
School of Engineering

1MT003 Hållfasthetslära, 7,5 högskolepoäng
Solid mechanics, 7.5 credits

Main field of study

Mechanical Engineering

Subject Group

Mechanical Engineering

Level of classification

First Level

Progression

G1F

Date of Ratification

Approved by the Board of the School of Engineering 2012-05-29

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 familiar with and be able to account for the general state of stress, principal stress and the most common effective stress measures and to calculate these for the

special case of the two-dimensional state

- be able to classify trusses by one of the following categories: mechanism, statically determinate or statically indeterminate, and be able to calculate the sectional force appearing in statically determinate trusses at the knot load
- be able to account for and calculate the sectional forces in a beam (both statically determinate and indeterminate)

exposed to different types of in-plane load

- be able on the basis of sectional forces to calculate normal and shear stress in a single-symmetric beam and an axis with a torque moment load
- be able to calculate the deformations appearing at beam, bar and axis loads

- be able to account for situations when instability phenomena may occur and to estimate the critical load.

Content

The course comprises the following elements:

- General stress and deformation states, principal stress and effective stress measures.
- Survey of constitutive relations; elasticity and plasticity
- Sectional forces in beams, bars and axes exposed to different types of load. Analyses of statically determinate

and indeterminate beams.

- Stress in beams exposed to bending and normal force load and axes exposed to torque.
- Elastic beam equation describing deformation in beam elements. Deformations in bar elements.
- Second-order effects; instability phenomena.

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 usually written and normally takes place during special examination periods. The assessment may also be based on submitted reports of laboratory work and exercises.

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.

Required Reading and Additional Study Material

Required reading

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