



# **SE1055 Strength of Materials and Solid Mechanics, Basic Course with Energy Methods 9.0 credits**

**Hållfasthetslära, grundkurs med energimetoder**

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

## **Establishment**

Course syllabus for SE1055 valid from Spring 2011

## **Grading scale**

A, B, C, D, E, FX, F

## **Education cycle**

First cycle

## **Main field of study**

Mechanical Engineering, Technology

## **Specific prerequisites**

Calculus II, part 1 + 2, Linear algebra, Differential equations and transform methods II, Mechanics, basic course, Mechanics, advanced course and Vector analysis in Physics, basic course.

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

In design and development of advanced products and process, it is important to assure the functionality. All products and processes are required to have the correct stiffness and not to break under service. In this course, you will learn about the mechanical properties of materials and components and how this knowledge is used to design products and processes with respect to stiffness and strength. Knowledge in strength of materials and solid mechanics design will make product development much more efficient since you will be able to answer question such as "Does it break?" or "Will there be too much deformations?" even before the prototypes has been built. The course contains basic knowledge and theory for continued work in mechanical engineering and the mechanical modelling of materials.

After the course, the participant should be able to

- determine stresses and deformations in truss structures, frames and composites using models for rods and beams
- determine stresses and deformations in axisymmetric structures.
- determine the loading applied on a crack.
- be able to determine the applicability of the models above and also understand the order of the approximations included in the models.
- account for energy methods in solid mechanics
- analyse one dimensional dynamic problems

## Course contents

To acquire knowledge about the basic principles and terminology of solid mechanics, mechanical behaviour of engineering materials, methods to solve important types of solid mechanics problems and ability to apply this knowledge for solution of simple problems of practical importance.

## Course literature

H. Lundh, Grundläggande hållfasthetslära. Hållfasthetslära , KTH, 2000.

Exempelsamling i hållfasthetslära, KTH, Hållfasthetslära, 2009.

Handbok och formelsamling i hållfasthetslära, KTH, Hållfasthetslära, 2014.

## Examination

- KON1 - Test, 3.0 credits, grading scale: P, F
- LAB1 - Laboratory, - credits, grading scale: P, F
- TEN2 - Examination, 6.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

## Other requirements for final grade

Written exam (TEN2; 6 university credits),  
passed test (KON1; 3 university credits),  
laboratory (LAB1; 0 university credits).

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.