



# SD2411 Lightweight Structures and FEM 8.0 credits

## Lättkonstruktioner och FEM

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 SD2411 valid from Autumn 2007

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

## Specific prerequisites

Base programme T, or equivalent. Some previous experience of FEM and Matlab programming is beneficial but not formally required.

## Language of instruction

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

## Intended learning outcomes

The course will give the student basic knowledge of the structural behaviour of beams, plates and shells, and the analysis and design of these types of structures, specifically, strength, stiffness, and weight issues for unstiffened and stiffened thin-walled structures.

After the course the student should be able to

- identify and describe the purpose and function of different members in lightweight structures
- choose appropriate structural elements for a given problem, with respect to function and weight
- analyse and design thin-walled beams and stiffened shells with respect to stress levels, deformation and structural stability
- describe the concepts of finite element codes and apply them for analysis of standard structural members
- explain discrepancies between results from different analytical methods due to the different approximations they involve

## Course contents

Survey of structural elements and design methods for lightweight structures. Introduction to the finite element method. Principles of stressed skin construction. Bending, shear, and torsion of open and closed thin-walled beams with and without stiffeners. Warping constraints. Kirchhoff plate theory. Buckling of thin plates and unstiffened and stiffened shells. Local instability.

## Course literature

Megson, T.H.G., Aircraft structures for engineering students, Third Edition, Edward Arnold 1999

Compendiums

## Examination

- LAB1 - Laboratory Work, 2.0 credits, grading scale: P, F
- LAB2 - Laboratory Work, 2.0 credits, grading scale: P, F
- TEN1 - Examination, 4.0 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 (TEN1; 5 university credits) and computer assignments (ÖVN1; 3 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.