SE2132 Applied Elasticity with FEM 9.0 credits

Tillämpad elasticitet med FEM

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

Establishment

Course syllabus for SE2132 valid from Autumn 2010

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

SE1025 FEM for engineering applications or the equivalent.
SE1025 can be read in parallel with SE2126 during the first reading period in the autumn.

Language of instruction

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

Intended learning outcomes

A structural analysis is fundamental to the design of competitive products, i.e. to minimize costs while ensuring proper product functionality. Consequently, a variety of numerical solid mechanical analysis tools as well as analytical methods are applied across different industries to ensure competiveness. This course aims at providing the know-how for a targeted use of such tools and methods. Specifically, the course focuses on an elastic solid mechanical analysis and provides students with theoretical and practical knowledge in order to solve practical engineering problems.

After the course, the participants should be able to

- account for the basic assumptions used for analysis of plates, shells and contact problems.
- explain the implications of these assumptions.
- formulate governing equations and boundary conditions for quasi-static two- and three dimensional problems of elasticity.
- solve simple quasi-static two- and three dimensional problems of elasticity using analytical methods.
- use a commercial finite element program in order to solve more complicated two- and three dimensional problems of elasticity.

Course contents

The course gives the foundation for two- and three dimensional theory of elasticity with applications to plates, shells, contact problems and rubber materials. The finite element method (FEM) is used throughout the course for analysis of more complicated problems of practical interest.

Course literature

Liu, G.R. and Quek, S.S., The finite element method, Butterworth-Heinemann, 2003.

Larsson, P.-L. och Storåkers B. Exempelsamling i elasticitetsteori, Hållfasthetslära, KTH, 2002.

Formelsamling i Hållfasthetslära, Hållfasthetslära, KTH, 2004.

Kurspärm med utdraget material

Examination

- PRO1 - Exercise, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 1.5 credits, grading scale: P, 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.

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

Other requirements for final grade

Written exam (TEN1; 4,5 university credits)
Laboratory work (LAB1; 1,5 university credits)
Project (PRO1; 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.