



SD2175 Numerical Methods for Acoustics and Vibration 9.0 credits

Numeriska metoder för akustik och vibrationer

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

Establishment

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

Basic courses in mathematics and mechanics.

Language of instruction

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

Intended learning outcomes

The goals of the course, for the student, are:

- To understand the difference between mathematical and numerical models.
- To perform simulations and computations with available software, Matlab, Comsol Multiphysics, Nastran etc.
- Be able to write simple code and make modifications to available programs.
- To understand the importance and limitations of a number of basic models with very broad applicability.
- To be able to critically judge results from simulations, quality, convergence, representation of physical phenomena etc.

Course contents

Introduction to numerical methods in engineering. Mathematical models versus numerical models. Galerkins method and method of weighted residuals. Simple elements. Stiffness method. Element formulations. Coordinate transformations. Isoparametry. Numerical interpolation. Convergence properties for dynamic problems. Hierarchical elements. Direct and iterative solvers. Eigenvalue analysis. Modal superposition. Integral equations. Examples of acoustic radiation and scattering using BEM. Simple fluid-structure interaction. Response analysis of a coupled problem. Modelling of damping and its effect on the response.

Course literature

Course compendium: Numerical methods in acoustics and vibrations.

Examination

- INL1 - Assignments, 3.0 credits, grading scale: P, F
- INL2 - Assignments, 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.

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

Other requirements for final grade

Examination, written test (TEN1; 4 university credits), Assignments (INL1; 3 university credits), Computer task, oral defence (INL1, 2 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.