



SD2170 Energy Methods 6.0 credits

Energimetoder

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

Establishment

Course syllabus for SD2170 valid from Spring 2022

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

Basic courses in mathematics, mechanics.

Language of instruction

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

Intended learning outcomes

Students graduating from the course shall be able to:

- explain and communicate the implications of uncertainty and complexity on the predictability of vibro-acoustic response.
- formulate the law of vibrational energy conservation in SEA form for some common structural and acoustic systems.
- explain and communicate the capability of the potential flow model for energy.
- explain and communicate the limitations of the potential flow model.
- take a decision on whether to use a commercial software for a particular problem

Course contents

Introduction to the “high-frequency” response of engineering structures. Free vibrational energy as a response variable. Statistical estimates of the maximum and mean response. Fuzzy structure attachments. The potential flow model and its failure for strong coupling and non-resonant motion. Asymptotic methods for modal density and vibration conductivity. SEA formulations for basic structures. The approximate solution to some “impossible” problems including: acoustic fatigue of space rockets, damage to colliding houses, vibro-acoustic transmission in multi-storey buildings and ships. Introduction to current areas of research and to complementary formulations such as the Wave Intensity Method, the Smooth Energy Method, the Power Injection Method, Transient SEA, the exact power balance formulation, hybrid SEA-FEM formulations. Introduction to commercial software and a computer exercise.

Examination

- TEN1 - 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.

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

Other requirements for final grade

Examination (TEN1; 6 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.