SD1116 Design of Silent and Vibration-free Products 6.0 credits

Konstruktion av tysta och vibrationsfria maskiner

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 SD1116 valid from Autumn 2024

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Basic mathematics in Calculus in One Variable, Calculus in Several Variables and algebra and geometry of at least 22.5 credits and basic mechanics of at least 7.5 credits

Language of instruction

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

Intended learning outcomes

The overall aim is to promote the development of quiet and vibration-free products and processes. The course participants should be provided knowledge necessary to carry out a relevant analysis of the sound and vibration properties of a product. The knowledge should also serve a basis for possible further studies in the sound and the vibration field.

After completing the course the student should be able to

1. Account for and explain key sound and vibration concepts and quantities.
2. Account for environmental consequences of sound and vibration.
3. Account for, explain and critically choose relevant mathematical models and methods to describe important sound and vibration quantities.
4. Apply relevant mathematical models and methods to calculate important sound and vibration quantities.
5. Measure a products sound emission properties.
6. Measure and assess the hand-arm vibration exposure of a handheld tool.

Course contents

- Fundamental sound and vibration concepts.
- Sound and vibration environmental aspects.
- Bestämmelser och standarder inom ljud och vibrationsområdet.
- Linear systems applied to sound and vibration.
- Frequency spectrum.
- Wave equations with solutions in the field of sound and vibration.
- Sound and vibration wave propagation, reflection, transmission and standing waves.
- Quasi-longitudinal and torsion waves in rods and shafts
- Bending waves in beams.
- Statistical room acoustics.
- Sound radiation.
- Sound generation.
- Vibration isolation.
- Sound in ducts.
- Silencers.
- Design of excitation forces for silent products and processes.

Examination

- LAB1 - Laboratory Exercises, 1.0 credits, grading scale: P, F
- TENA - Written Theory Examination, 3.0 credits, grading scale: P, F
- TENB - Written Problem-solving Examination, 2.0 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.

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.