

Course program

Acoustics VTAF05 7,5 hp – Autumn semester 2011

Purpose and content

The purpose of the course in acoustics is to give knowledge of sound propagation in different media, in fluid such as air and in vibrating systems of solid structural elements, where different wave types and their properties, longitudinal wave, transversal wave and bending wave, are introduced. The students are given a general description of oscillating systems and how a structural acoustic wave is excited, transmitted in different structural elements and radiates from them. Resonance phenomena in rooms as well as in structures are treated, along with room acoustical phenomena, models and techniques.

This knowledge is applied in noise problems between apartments where air borne sound isolation and step sound isolation is modelled and measured. Practical solutions are being introduced in order to achieve good sound isolation in the building of new houses as well as in existing houses with noise problems.

Literature and resources

Lecture notes and distributed written materials.

Teachers – Engineering Acoustics

Delphine Bard, delphine.bard@acoustics.lth.se

Course responsible, lectures

Kristian Stålné, kristian.stalne@construction.lth.se

Lectures, exercises

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Project task

Juan Negreira Montero, juan.negreira_montero@construction.lth.se

Exercises

Christina Glans, christina.glans@bekon.lth.se

Course administration

Examination

The course will be examined by means of a project task that will be solved practically and a written exam. The project task and the exam are each given the grade "u", "3", "4" or "5", where "u" means failed. The final grade is given by weighing both grades according to: project task: 50% and exam 50% (practically this means the mean value, and if comes between to grades the grade of the project task will decide). For passing the course both project course and exam have to be passed.

Laborations

The course contains laborations will be performed:

Lab

- 1 Resonance frequencies in plates and Impedance measurement in Kundt-tube
- 2 Room acoustics, reverberation time and eigenfrequencies
- 3 Measurement of sound transmission and step sound isolation

Project task

The project task includes modelling and measuring sound transmission in a structure that is mounted in the acoustic lab, air borne and structure borne sound.

There is also the possibility to perform a project about room acoustics that includes modelling and measuring reverberation time and other room acoustical parameters at different interior.

Week schedule

The course is scheduled Tuesdays 8-12 in V:N2 and Fridays 13-15 in V:R1, that will be comprise lectures, exercises and computer exercises. Also there will be required time for self study, project task and laborations.

<i>Week</i>	<i>Course moment</i>	<i>Teacher</i>
1	Introduction, Wave propagation in solid media and in fluids. Longitudinal, transversal and bending waves.	KS
2	Reflection and transmission. Eigenfrequencies and eigen modes in room and in structures.	KS
3	Room acoustics.	DB
4	Air borne and step sound isolation, models for calculations.	DB
5	Sound radiation, radiation factor and damping in structures.	KS
6	Measurement technique, signal and frequency analysis, project work	AS KS
7	Projects and presentations	All

Written exam takes place on Thursday, 15 dec at 8-12 in V:N1 and V:N2