Physics of Sound

Programme course

6 credits

Ljudfysik

TFYA65

Valid from: 2017 Spring semester

Determined by
Board of Studies for Computer Science
and Media Technology

Date determined
2017-01-25

Main field of study
Applied Physics, Media Technology and Engineering

Course level
First cycle

Advancement level
G2X

Course offered for
- Media Technology and Engineering, M Sc in Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Signals and Systems, Transforms Theory

Intended learning outcomes
The course aims at providing the students knowledge about sound and acoustics. After the course the student should be able to:

- Recognize, describe and solve simple problems of sound generation, propagation and other phenomena related to sound waves.
- Know and explain about the human perception of sound.
- Understand and explain the description of sound in the frequency domain
- Describe the function and properties of electronic circuits related to audio technology, and know how common audio related measurements are performed.
- Understand the basic concepts of room acoustic and explain how to influence the acoustics of a room.
- Know the basics of different audio formats, audio recording and post treatment as well as digital audio and signal processing.

Course content
Basic description of sound waves and physical phenomena related to them. Sound propagation and room acoustics. Psycho-acoustics: the human perception of sound. Properties of some different sound producers. Audio measurements and electronic circuits related to the sound. Introduction to digital sound, various digital audio formats and signal processing. The basics of sound recording and audio processing.

Teaching and working methods
The course consists of lectures, laboratory experiments and a project assignment.

Examination

PRA1	Project assignment	1.5 credits	U, G
LAB1	Laboratory work	1.5 credits	U, G
TEN1	Written examination	3 credits	U, 3, 4, 5

Grades
Four-grade scale, LiU, U, 3, 4, 5

Department
Institutionen för fysik, kemi och biologi

Director of Studies or equivalent
Magnus Johansson

Examiner
Per Sandström

Course website and other links
http://www.ifm.liu.se/undergrad

Education components
Preliminary scheduled hours: 40 h
Recommended self-study hours: 120 h

Course literature

Additional literature

Books

Alton F. Everest, *Master Handbook of Acoustics*
Ken C. Pohlmann, *Principles of Digital Audio*

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.