

Course Manual IAK

Acoustics for Engineers

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– General information

Long name	Acoustics for Engineers
Approving CModule	IAK BaET , IAK BaTIN
Responsible	Prof. Dr.-Ing. Christoph Pörschmann Professor Fakultät IME
Valid from	winter semester 2022/23
Level	Bachelor
Semester in the year	winter semester
Duration	Semester
Hours in self-study	78
ECTS	5
Professors	Prof. Dr.-Ing. Christoph Pörschmann Professor Fakultät IME
Requirements	Basic knowledge mechanics knowledge time domain / frequency domain operations Calculations with real and imaginary values Basic knowledge integral and differential mathematics
Language	German
Separate final exam	Yes

Literature

Boré, G., Peus, S. (1999). „Mikrophone für Studio und Heimstudio-Anwendungen – Arbeitsweise und Ausführungsbeispiele,“ Hrsg. Georg Neumann GmbH, Berlin.

Blauert, J., Xiang, N. (2008). „Acoustic for Engineers – Troy Lectures,“ Springer Verlag, Heidelberg.

Blauert, J., Braasch, J., Jekosch, U. (2012). „Acoustics for Communication – Dresden Lectures,“ Springer Verlag Heidelberg, in Vorbereitung.

Dickreiter, M., Hoeg, W., Dittel, V., Wöhr, M. (2008). „Handbuch der Tonstudioteknik,“ 7. Auflage, Saur Verlag, München.

Görne, T. (2011). „Tontechnik,“ Hanser Verlag München.

Kuttruff, H. (2004). „Akustik – Eine Einführung,“ S. Hirzel Verlag, Stuttgart.

Cremer, L. (1976). „Vorlesungen über Technische Akustik,“ Springer Verlag, Berlin, Heidelberg.

Lord Rayleigh (1896). „The Theory of Sound,“ 2nd Edition 1896, Dover Publ. New York.

Müller, G, Möser, M. (2004). „Taschenbuch der Technischen Akustik,“ Springer Verlag Berlin, 3. Auflage.

Veit, I. (2005). „Technische Akustik“, Kamprath-Reihe, Vogel-Verlag, Würzburg.

Weinzierl, Stefan (2008). „Handbuch der Audiotechnik,“ Springer Verlag, Berlin.

Blauert, J.,(2005) „Communication Acoustics,“ Springer Verlag Heidelberg,

Blauert, J.,(2021) „Acoustics for Communication,“ Springer Verlag Heidelberg, upcoming

Final exam

Details

Oral examination - graded

The students explain the application-related problems using simple examples, they explain and describe how they relate them to practical applications and which conditions must be observed. The students prove that they can relate these concepts independently to real value problems.

Minimum standard

The students need to illustrate simple relationships. The description is supported by the examiner.

Exam Type

EN mündliche Prüfung, strukturierte Befragung

– Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	Introduction of the basic acoustic parameters Sound pressure, sound velocity, flow, power Logarithmic quantities and levels
Knowledge	Mechanical and acoustic vibration systems Mechanical vibration systems Acoustic vibration systems
Knowledge	Sound propagation in the room Homogeneous plane wave standing waves resonance systems diffraction, refraction, reflection
Knowledge	point sources Behaviour of sound pressure and sound velocity elementary radiator synthesis
Knowledge	Concepts of loudspeakers and microphones) Principles of directional microphones Electrodynamic microphones and headphones Piezoelectric microphones and headphones Dielectric microphones
Knowledge	absorbers Porous Absorbers Helmholtz resonators as absorbers plate absorber
Skills	Analysis and description of systems with loudspeakers and microphones
Skills	Calculation and description of the entire sound propagation chain from the microphone via the mechanoelectric conversion, the transmission via a communication link as well as the conversion via an electromechanical transducer and the sound radiation.

Special requirements

none

Accompanying material	Script (electronic or printed)
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Separate exam	No
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Expenditure classroom teaching

Type	Attendance (h/Wk.)
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Lecture	2
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Exercises (whole course)	1
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Exercises (shared course)	0
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Tutorial (voluntary)	0
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– Practical training

Learning goals

Goal type	Description
Knowledge	Simulation of the propagation of sound waves
Knowledge	Investigation of sound reflection on Kundt's tube
Knowledge	Analysis of eigenmodes
Skills	perform practical measurements based on described tasks
Skills	create functional measurement setups
Skills	prepare adequate documentation for measurements carried out
Skills	Evaluate and discuss measurement results

Special requirements

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Accompanying material	printed decription
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Separate exam	No
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Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	1
Tutorial (voluntary)	0