

## Courses in English

### Course Description

<b>Department</b>	06 Applied Sciences and Mechatronics
<b>Course title</b>	<b>Engineering Acoustics (Course No. PBR 670)</b>
<b>Hours per week (SWS)</b>	4
<b>Number of ECTS credits</b>	5
<b>Course objective</b>	<p>In relation to the higher learning targets of the course, this module specially introduces competences and skills for the physics applications and knowledges in new acoustic technologies.</p> <p>Specifically, the following fields of competences are covered:</p> <p><b>Expertise:</b> The module provides in-depth physics and engineering knowledges of vibrations and sound waves in technical applications as well as the ability to identify suitable models and to find acoustic solutions for a number of challenges in current new technologies.</p> <p><b>Methodological competence:</b> Students can analyze vibrations of systems and acoustic wave propagation in media for vibration damping, noise damping and can carry out measurements and develop acoustic measures, whereby the occurring effects are to be identified and important and unimportant features to be distinguished. Students can describe the applicationproblems by using vibration and acoustic models and then build and solve simulation models. Students are able to analyze the developed solutions and to recommend improvements.</p> <p><b>Social skills:</b> Students are doing exercises and experiments in small teams and can improve their communication and collaboration skills. The acoustic course is offered in English for international students as well.</p> <p><b>Self-competence:</b> Students are able to analyze complex acoustic issues independently and can derive acoustic solutions. They can obtain and reflect their own abilities in relation to one of technologically and socially relevant fields of future activities.</p>
<b>Prerequisites</b>	University Mathematik, Physics, Signal Processing, Measurement Techniques
<b>Recommended reading</b>	Möser, M.: Technische Akustik,, Springer-Verlag Sinambari, Gh., Sentpali, S.: Ingenieurakustik, Springer Vieweg Fahy, F. Fundamentals of Engineering Acoustics, Elsevier Academic Press Kinsler, L. E., Frey, A. R., Coppers, A. B., Sanders, V.: Fundamentals of Acoustics, , John Wiley & Sons, Inc Möser, M.: Mestechnik der Akustik, Springer-Verlag Blackstock, D. Fundamentals of physical acoustics, John Wiley & Sons, Inc.
<b>Teaching methods</b>	Exercises and advanced acoustic experiments
<b>Assessment methods</b>	exam
<b>Language of instruction</b>	English
<b>Name of lecturer</b>	Prof. Dr. Datong Wu
<b>Email</b>	<a href="mailto:datong.wu@hm.edu">datong.wu@hm.edu</a>
<b>Link</b>	<a href="https://t1p.de/hzsp">https://t1p.de/hzsp</a>

### Course content

In relation to the learning objectives of the course, this module contributes in particular to competence area 3: Application of physics knowledges in new technologies.

The module introduces the fundamental physics of structure-borne noise, airborne noise and sound propagations (outdoors, in rooms and in tubes) and the abilities to identify, measure and calculate the corresponding acoustic parameters.

Competencies: After completing the course, students can configure and apply acoustic measurement technologies, evaluate noise damping measures and work on basic acoustic problems.

Exercises and Experiments: lab experimens accompanying the lecture, problems from the applications, carrying out the experiments in small groups.

- Vibration technology, passive and active vibration damping technologies
- Electrical, mechanical and acoustic analogy
- Physical fundamentals of the sound field
- Generation, propagation, measurement and evaluation of sound waves
- Radiation of sound sources (near and far field)
- One-third octave and octave filters
- Room acoustics
- Noise damping and sound absorption
- Silencers for pipes
- Vibration measurement technology and acoustic measurement technology
- Industrial applications

### Remarks