Modul 1550 Computational Acoustics (engl.) (CompA)

zugeordnet zu: Studiengang 965 Berechnung und Simulation im Maschinenbau

Studiengang:
[965] Berechnung und Simulation im Maschinenbau
Pflichtkennzeichen:

ECTS Credits: 5.0 Type of exam: [KB] Order written exam

Responsible Lecturer:	Prof. Dr.-Ing.Ihlenburg
Lecturer:	Prof. Dr.-Ing.Ihlenburg
Recommended semester:	1st or 2nd semester
Workload:	On campus 4g, self-study 72h
Course language:	English

Course objectives:

Fachlich-inhaltliche und methodische Kompetenzen

The participants are introduced to the analytical basics of vibroacoustic and aeroacoustic systems. The focus is on the interaction of thin-walled structures and air in general and cabin sound in particular. The study of theoretical material is complemented by laboratory exercises using commercial FE solvers.

Sozial- und Selbstkompetenz

The participants are encouraged to participate actively in the seminary discussions. An oral presentation of the laboratory results is obligatory for all the participants.

Contents:

Part 1: Preliminaries

- Fluid mechanics
- Structural dynamics

Part 2: Acoustics

- Nature of Sound
- Propagation of Sound
- Sources of Sound

	Part 3: Aeroacoustics • Lighthill analogy • Ffowcs-Williams-Hawkings analogy Part 4: Vibroacoustics • Fluid-Structure Interaction • Vibroacoustics with FEM • Cabin Acoustics Guest Lectures: Case Studies from Industry
About didactics:	Seminaristischer Unterricht, Selbststudium, Laborübungen, Gastvorträge Folien, PC, Beamer
Literature:	• D.J. Inman, Engineering Vibrations, Prentice Hall, 1990 • L. Cremer and M. Heckl, Structure-Borne Sound, Springer Verlag 2005 • Frank Fahy, Foundations of Engineering Acoustics, Academic Press, London 2000 • L.E. Kinsler, Fundamentals of Acoustics, Wiley 1982 • F. Ihlenburg, Finite Element Analysis of Acoustic Scattering, Springer Verlag New York 1998 • F. Ihlenburg, Sound in Vibrating Cabins, in: R. Ohayon (ed.) Acoustic Fluid-Structure Interaction, Springer-Verlag Wien 2008 • E. Skudrzyk, The Foundations of Acoustics, Springer Verlag Wien 1971 • I. Veit, Technische Akustik, 6. Auflage, Vogel-Verlag 2005 • M. Möser, Technische Akustik, Springer Verlag 2007 • F. G. Kollmann, T. Schlösser, R. Angert, Praktische Maschinenakustik, Springer Verlag 2006 • Gross, Hauger, Schnell, Wriggers, Technische Mechanik 4, Springer Verlag
Requirements:	Obligatory: Bac. In Mech. Eng.or related field, course in Engineering Vibrations