Architectural Acoustics

Introduction

Achilleas Xydis, Christian Frick, Jürgen Strauss

Agenda

- 15:45 - 16:30 Introduction
  Your lecturers
  Your guest speakers
  Course topics - an overview
- 16:45 - 17:30 Getting in touch with your gear, IDL demonstration
- 17:45 - 18:25 Getting in touch with your gear, IDL demonstration
- 18:25 - 18:30 Wrap up and feedback

Learning objectives

This course introduces acoustics and its practical applications in architecture and room design.

- Knowledge Acquisition
- Application of Mathematical and Physical Concepts
- Critical Thinking and Analysis
- Human Perception of Sound
- Application of Acoustic Principles in Real-World Scenarios
- Communication and Presentation, active Participation in Acoustic Discussions
- Sensitisation in Hearing and Aware Perception
- Critical Evaluation and Comparison of Acoustic Properties in Architectural Design
- Multidisciplinary Approach

Your lecturers

Achilleas Xydis

Christian Frick

Jürgen Strauss

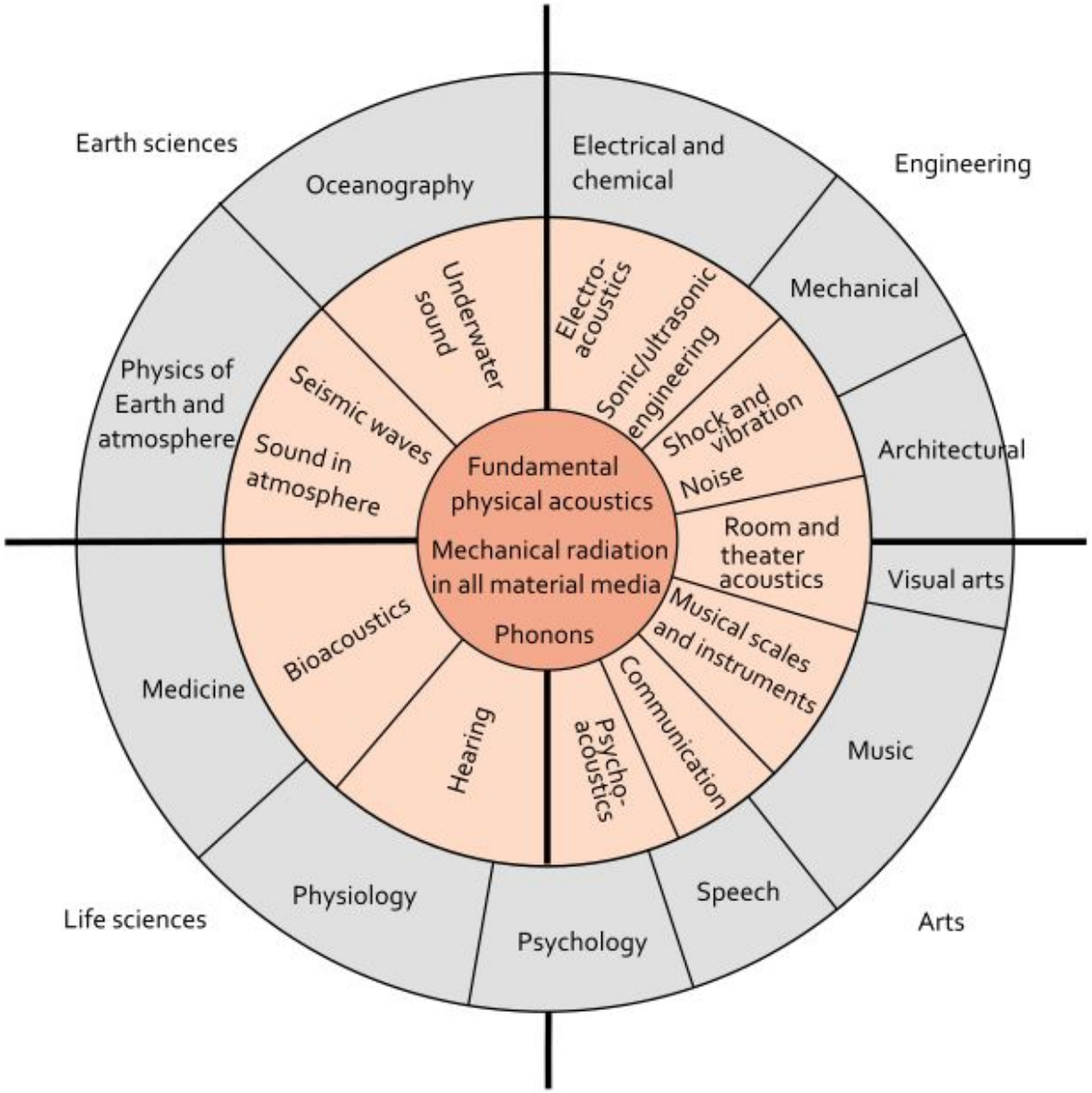
Course agenda

HS 2024

19.09.24	**Introduction**	**all**
26.09.24	Acoustic space impression	JST
03.10.24	Auditory perception	CFR
10.10.24	Basic maths and physics	CFR
17.10.24	Room Acoustics	CFR
31.10.24	Acoustics and arts	guest
07.11.24	Wallace Clement Sabine	JST
14.11.24	Guidelines and standards	CFR
21.11.24	Guest lecture 2	
28.11.24	Time for final project	
05.12.24	Final presentations	all

Course topics - an overview

Architectural acoustics is a branch of acoustical science that deals with the design and modification of buildings and enclosed spaces to achieve optimal sound quality and control within those environments. It focuses on enhancing the acoustic properties of rooms, auditoriums, concert halls, theaters, offices, and various architectural structures to ensure that sound behaves in a desirable and functional manner.



Course topics - an overview

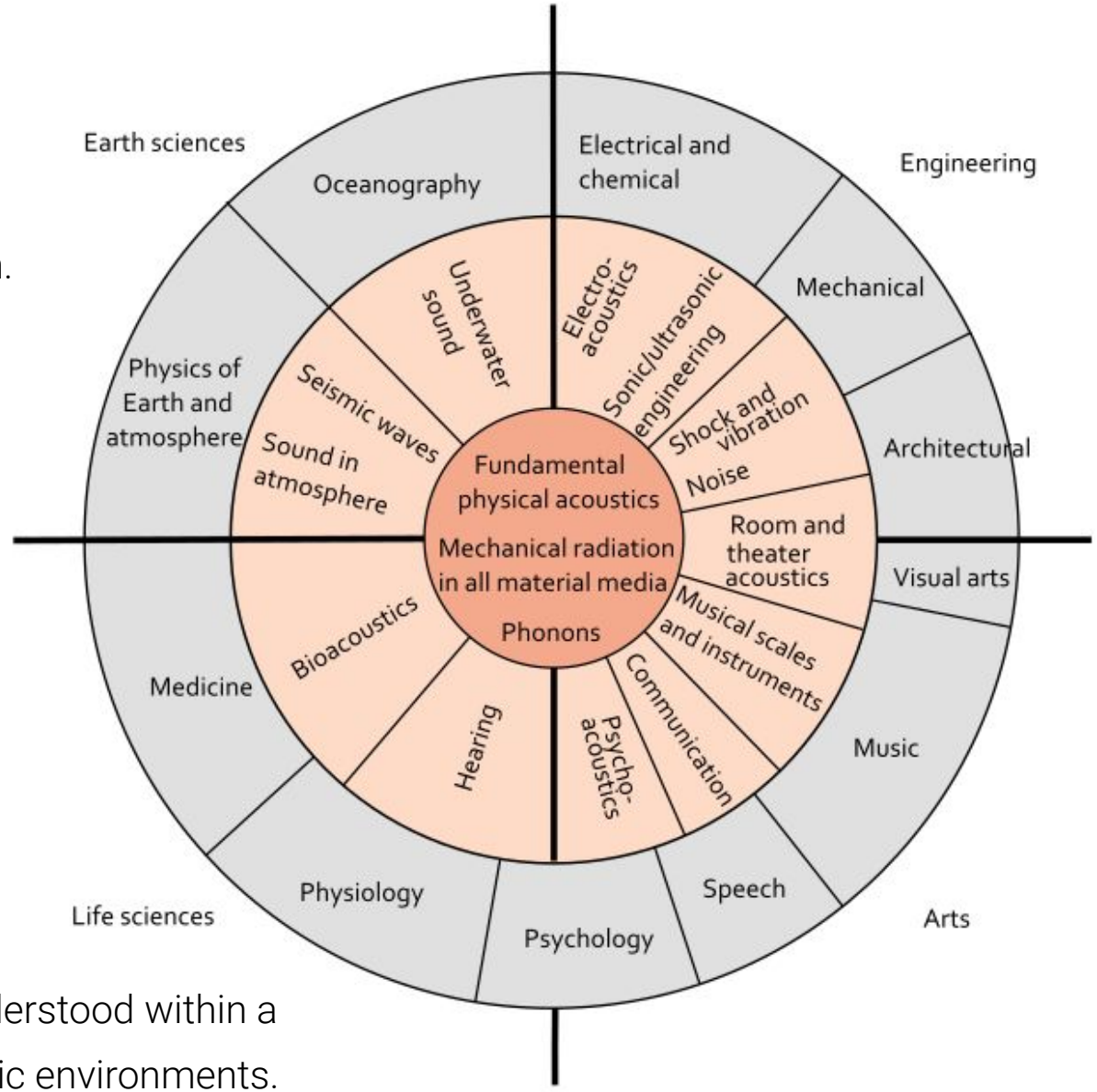
Sound insulation: Preventing unwanted sound from entering or escaping a space, ensuring privacy and reducing noise pollution.

Sound absorption: Managing the absorption of sound within a room to minimize echoes and reverberation, creating a comfortable listening environment.

Sound diffusion: Distributing sound energy evenly throughout a space to reduce acoustic hotspots and achieve a more balanced acoustic environment.

Sound reinforcement: Designing spaces to optimize the transmission and amplification of sound in settings like auditoriums, theaters, and concert halls.

Speech intelligibility: Ensuring that spoken words are clear understood within a given space, which is crucial in educational, corporate, and public environments.



Course materials and gear

All presentations, assignments, and further documentation can be found on the course's webpage www.aa.arch.ethz.ch




Further readings

- Adelman-Larsen, Niels Werner. *Rock and Pop Venues, Acoustic and Architectural Design.* 2nd ed., Springer Verlag Berin Heidelberg, 2021. (ISBN 978-3-030-62319-7)
  Chapter 2 provides inputs about the terms, language and concepts of Auditorium Acoustics.
- Fasold, Wolfgang; Veres, Eva. *Schallschutz und Raumakustik in der Praxis*. 2nd ed., Huss-Medien, 2003. (ISBN: 3345008017)
  A must have, although no longer in stock.

Wrap up and Feedback