

## Room Acoustics

Academic Year: ( 2023 / 2024 )

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Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: HERMOSILLA CASTO, JORGE

Type: Electives ECTS Credits : 3.0

Year : Semester :

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Electromagnetics Fields  
Electroacoustic systems and sound

## OBJECTIVES

The students will acquire sound knowledge of the field of room acoustics. They will be able to assess different solutions for acoustic insulation and conditioning. Additionally, the students will learn to interpret different acoustic parameters measured in rooms and to address the design of acoustic rooms.

## DESCRIPTION OF CONTENTS: PROGRAMME

- 1.- Acoustic laws that govern the indoor acoustic propagation. Concepts in room acoustics: reverberation time, echogram and natural mode.
- 2.- Acoustic insulation of rooms. Aerial and impact noise insulation. Basic solutions.
- 3.- Acoustic conditioning. Acoustic materials. Variable acoustic systems.
- 4.- Acoustic room parameters in different scenarios.
- 5.- Acoustic parameters based on the room impulse response.
- 6.- Acoustic design guidelines.
- 7.- Advanced concepts in sonorization.

## LEARNING ACTIVITIES AND METHODOLOGY

Three teaching activities are proposed: theoretical classes, guided projects and lab exercises.

## THEORETICAL CLASSES

The theoretical class will be given in the blackboard, with slides or by any other means to illustrate the concepts of the lectures. In these classes the explanation will be completed with realistic examples of room acoustic designs.

In these sessions the student will acquire the basic concepts of the course. The students will have to work on the explained concepts, working out and solving the proposed assignments in order to consolidate the concepts of the course. (PO: a, e, g)

## GUIDED PROJECTS

The students, working in small groups, will carry out a simple guided project addressing the acoustic design of a room. To this end, the students will be given a detailed guide and some specific tutoring. (PO: a, c, d, e, g, k)

## LABORATORY EXERCISES

The lab exercises will help the students familiarize themselves with measurements in room acoustics; for example: acoustic insulation, room impulse response measurement, etc. Additionally, the students will use software for acoustic design. (PO: b, g, k)

## ASSESSMENT SYSTEM

**% end-of-term-examination/test:** 50

**% of continuous assessment (assignments, laboratory, practicals...):** 50

The final grade will be a weighted sum of partial grades coming from: class exercises (10%) (PO: a, b, c, d, e, k) (including report (g) and oral presentation (g)), lab exercises (35%) (PO: b, g, k), class test (5%), and a final written exam (50 %) (PO: a, e, f, g).

Final written exam is required in order to obtain final score. A minimum grade of 3.5/10 is required in this exam.

#### BASIC BIBLIOGRAPHY

- Higini Arau ABC de la Acústica Arquitectónica, Grupo CEAC 1999.
- Manuel Recuero Acústica Arquitectónica, Segunda Edición 1993.

#### ADDITIONAL BIBLIOGRAPHY

- KUTTRUFF, H. Room Acoustics, Elsevier Applied Science, 1991.