

31001 - Environmental and architectural acoustics

Syllabus Information

Academic year: 2024/25

Subject: 31001 - Environmental and architectural acoustics

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 581 - Bachelor's Degree in Telecommunications Technology and Services Engineering

ECTS: 6.0

Year: 4

Semester: Second semester

Subject type: Optional

Module:

1. General information

The *Environmental and Architectural Acoustics* subject aims to provide the student with a vision of the different acoustic phenomena and their particularities in enclosures as well as the basic techniques of sound conditioning and acoustic impact assessment. It contributes to introduce the student to the aspects related to the acoustic conditioning of rooms and enclosures and noise impact assessment.

In order to follow this subject normally, it is recommended that the student has previously taken the following courses: Radiation and Propagation, Audio and Image Processing and Acoustics Engineering.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>) and the activities foreseen in this subject will contribute to some extent to the achievement of targets 7.3, 7b, 8.2, 9.1 and 9.5 of the corresponding goals.

2. Learning results

RA1- Know and apply the principles of room acoustics: sound propagation in enclosed spaces, reverberation time, noise from external sources, transmission of airborne, impact and vibration, acoustic barriers, acoustic insulation.

RA2- Know and handle the characteristic parameters of materials for acoustic conditioning and acoustic insulation.

RA3- Know and manage passive and active noise and vibration measurement, analysis and control systems.

RA4- Be able to make an acoustic environmental impact assessment.

RA5- Know the legislations related to noise. (UNE Standards, ISO,... Local, regional, state and community legislation (). Be aware of the requirements and recommendations for acoustic quality in enclosures.

RA6- Know how to carry out acoustic engineering projects on insulation and acoustic conditioning of premises and PA installations.

3. Syllabus

Theory

Unit 1. Introduction. Review of physical acoustics and magnitudes

Unit 2. Fundamentals of Environmental Acoustics.

Unit 3. Acoustic Conditioning.

Unit 4. Acoustic Isolation.

Practices

Practice 1. Sonometry.

Practice 2. Computational Acoustics: Finite Element Method I.

Practice 3. Statistical theory: finite element method II.

Practice 4. Geometric theory: optimum reverberation time.

Practice 5. CAD for acoustic conditioning. Application of the CTE and psycho-acoustic measures.

4. Academic activities

Face-to-face activities

Times and dates defined by EINA.

- Participative lectures and resolution of problems and cases: 40 + 10 hours, in classroom.
- Laboratory practices: 10 hours in 5 sessions of three hours, in small groups, in laboratory.
- Evaluation tests: 3 hours, in classroom.

Other activities:

- Personal work (study, problem solving and writing of practice reports)

This course is English Language Friendly, which means that: the course syllabus is also available in English; the study and class materials are in English; the faculty is willing to conduct office hours in English; and students are allowed to take their assessments in English

5. Assessment system

The student will have a global test in each session. The grade will be calculated as follows:

1. Written exam (70%) with two parts, both with the same weight: a theoretical part in which the acquired knowledge is evaluated by means of a series of short questions and a practical part in which the ability to solve problems is evaluated.
2. Laboratory practicals (30%) The assessment will be carried out through the presentation of a written report in a specified format, with a deadline per specified format, with a deadline for each practical.

In order to pass the subject it will be necessary to obtain a minimum of 4.5 out of 10 in each of the three parts of the assessment (exam, practices and works).

Those students who have not been able to complete the practices and/or work during the term will have the possibility of passing them by means of an exam in the corresponding call

6. Sustainable Development Goals

- 3 - Good Health & Well-Being
- 9 - Industry, Innovation and Infrastructure
- 11 - Sustainable Cities and Communities