

30378 - Audio and image processing

Syllabus Information

Academic year: 2023/24

Subject: 30378 - Audio and image processing

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

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

ECTS: 6.0

Year: 3

Semester: Second semester

Subject type: Compulsory

Module:

1. General information

The subject Audio and Image Processing is a subject corresponding to the mention of Sound and Image, but it is proposed that all the students of the Degree take it in a compulsory way, considering that it is considered of interest for all the Graduates. This subject belongs to the Audio and Video Systems block. The subject is closely related to common branch subjects receiving support from Signals and Systems and Digital Signal Processing.

These approaches and objectives are aligned with some of the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>). Specifically, the learning activities foreseen in this subject will contribute to the achievement of targets 8.2 and 8.3 of Goal 8 and targets 9.5 and 9.c of Goal 9.

2. Learning results

Know the basic applications of digital audio and image signal processing, understanding the problems that arise in each of them, identifying the basic signal processing tasks that can help to solve them.

Know how to characterize discrete stochastic processes in the time and transformed domains and their interaction with linear and time invariant systems.

Understand the basic general concepts of parameter estimation in processes, and know how to apply the basic estimators for the first and second order moments of stochastic processes as well as for their spectra.

Understand the concept of optimal linear filtering and its adaptive implementation, and know how to apply them to audio and image signals for a variety of purposes: filtering and noise cancellation, modeling, prediction, equalization.

Know how to apply the most common data compression methods for different types of audio and image signals.

3. Syllabus

1.- INTRODUCTION TO AUDIO AND IMAGE SIGNALS.

2- ESTIMATION AND CHARACTERIZATION OF AUDIOVISUAL SIGNALS

3- OPTIMAL AUDIO AND IMAGE FILTERING: LINEAR SYSTEMS AND NEURAL NETWORKS.

4 - ORTHOGONAL TRANSFORMS AND THEIR APPLICATION IN AUDIO AND IMAGE COMPRESSION.

4. Academic activities

Participative lectures

Classroom practices

Laboratory practices

Tutored practical work

Tutoring.

Assessment

5. Assessment system

Written tests (60%). Composed of open-ended questions and multiple choice questions. Minimum grade of 4.

Supervised practical work (20%). The analytical and critical capacity of the student in the resolution of medium-sized problems using the necessary calculation and simulation tools, answering the questions posed, and presenting, transmitting and interpreting the results obtained will be fundamentally valued. Student initiatives to address original solutions will be particularly appreciated.

Practices (20%). The assessment of the practice will be done through the requested documentation and the observation of performance and attitude in the sessions.

If the student has not passed any of these activities during the semester, they will have the opportunity to pass the subject by means of a global test in the two official exam calls.