

Academic Year/course: 2021/22

## 31002 - Audiovisual equipment and systems

### Syllabus Information

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**Academic Year:** 2021/22

**Subject:** 31002 - Audiovisual equipment and systems

**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:** First semester

**Subject Type:** Optional

**Module:**

## 1. General information

### 1.1. Aims of the course

The course and its expected results respond to the following approaches and objectives:

The subject "Audiovisual Equipment and Systems" aims to train the student in the set of theoretical knowledge, state-of-the-art techniques and complete systems, necessary for the acquisition, treatment, coding and editing of audio and video.

The course will primarily study fully digital systems and there will be a complete description of the elements that compose them. It is intended that the student will be able to develop an audio and video installation in its basic aspects of technology selection, sizing and connection of equipment, from the point of view of electronic systems.

To this end, the set of fundamental objectives can be summarized as follows:

- To know the audio and video systems, their typology, planning, main uses and historical perspective.
- To know the audio and video signals, their structure and their electronic transmission layer.
- To know the interconnection and cabling technologies, audiovisual standards and control of audio and video systems.
- To know the uses, technologies and specifications of professional audio and video installations.

These approaches and objectives are aligned with some of the Sustainable Development Goals, SDGs, of the 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>) and certain specific goals, so that the acquisition of the learning outcomes of the subject provides training and competence to the student to contribute to some extent to their achievement:

- Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Target 8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high value-added and labour-intensive sectors

- Goal 7: Ensure access to affordable, secure, sustainable and modern energy for all

Target 7.3 By 2030, double the global rate of improvement in energy efficiency.

Target 7.b By 2030, expand infrastructure and improve technology to provide modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, consistent with their respective support programmes."

- Objective 9: Industry, innovation and infrastructure

Target 9.5 Increase scientific research and upgrade technological capabilities in industrial sectors in all countries, in particular developing countries, including through fostering innovation and significantly increasing, by 2030, the number of research and development personnel per million population and public and private sector research and development expenditures

Target 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in the least developed countries by 2020.

Target 9.1 Develop reliable, sustainable, resilient and quality infrastructure, including regional and cross-border infrastructure, to support economic development and human well-being, with particular emphasis on affordable and equitable access for all.

### 1.2. Context and importance of this course in the degree

The subject "Audiovisual Equipment and Systems" is part of the Sound and Image Mention, specifically is part of the subject

Audiovisual Equipment and Systems.

The audio video systems represent a good example of integration of different technologies both electronic and signal processing and transmission, both analog and digital. Through this course the student will have access to the technological knowledge necessary to understand, analyze and select the most appropriate systems for a professional audiovisual environment.

The concepts and knowledge developed allow the student to reinforce the relationships between different subjects of the degree and to value the importance of the interrelation of technologies when developing an audiovisual system. The course, within the degree, maintains a direct relationship with previous basic subjects, especially with "Analog Electronics", "Digital Electronics" and "Digital Signal Processing".

Furthermore, this course is part of the subject "Audiovisual equipment and systems" and is closely related to the subjects "Audio and video installation projects" and "Sound and image processing".

### 1.3. Recommendations to take this course

The course will be taught by professors of the Electronic Technology Area of the Department of Electronic Engineering and Communications.

In order to follow this course normally, it is recommended that the student has previously studied the basic subjects of the first and second year. It is especially recommended the knowledge of the subjects "Analog Electronics", "Digital Electronics" and "Digital Signal Processing".

On the other hand, the student is recommended to actively attend class (both theory and problems), and to carry out the practicals. In the same way, the student is recommended to take advantage of and respect the tutoring schedules of the professors to solve possible doubts. The course has an important percentage of practical content and personal work, so it is strongly recommended the continuous monitoring of the proposed activities.

## 2. Learning goals

### 2.1. Competences

**Upon passing the course, the student will be more competent to...**

- Conceive, design and develop engineering projects (C1).
- Solve problems and make decisions with initiative, creativity and critical reasoning (C4).
- Ability to manage information, handling and application of technical specifications and legislation necessary for the practice of engineering. (C9)
- Ability to learn continuously and develop autonomous learning strategies. (C10)
- Ability to apply information and communication technologies in engineering. (C11)
- To build, operate and manage systems for the capture, transport, representation, processing, storage, management and presentation of multimedia information, from the point of view of electronic systems (CS11).
- Ability to analyze, specify, implement and maintain television, audio and video systems, equipment, headends and installations, both in fixed and mobile environments (CS12).

### 2.2. Learning goals

**In order to pass this course, the student must demonstrate the following results...**

- Knows the different fields of application of audio and video equipment, installations and systems.
- Is able to propose, design, adapt, optimize and manage an audio and video installation that connects equipment and services from different fields, is integrated in an acoustic and architectural framework and is sensitive to the socioeconomic aspects present in each case.
- Knows, at a basic level, the techniques of design, organization, planning and execution of an audio and video systems installation project.
- Is able to generate project information: proposals, bids, budgets, specifications and reports, efficiently and attractively in a competitive market.

### 2.3. Importance of learning goals

The basic understanding of the subject "Audiovisual Equipment and Systems", as well as the principles on which this subject is based, is important for the exercise of the competences of a graduate in Telecommunication Technologies and Services Engineering and especially for those students who want to develop their skills in the knowledge, design and management of audiovisual systems, of such importance nowadays.

The course is based on providing students with the knowledge, skills and competences that allow them to understand the audiovisual equipment in terms of its use, design, selection, handling and management.

The subject "Audiovisual Equipment and Systems" also allows to apply the knowledge of other subjects of electronic technology and communications technologies (Fundamentals of Electronics, Analog Electronics, Digital Electronics,

Electronic Systems with Microprocessors, Digital Signal Processing) as well as to put in context the knowledge of sound and image subjects (Audio and Image Processing, Audio and Video Installation Projects), not only from the formal point of view, but in its concrete application to an audiovisual equipment.

This dynamic can be completed in subsequent elective subjects of audiovisual content and in the realization of the final degree work.

### 3. Assessment (1st and 2nd call)

#### 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

**The student must demonstrate that he has achieved the expected learning outcomes through the following assessment activities**

The student will have an assessment through continuous assessment and global test in each of the calls established throughout the course. The dates and times of the global test will be determined by the Center. The qualifications will be obtained in the following way:

##### 1) Continuous evaluation

###### a. Assessable tasks (20%)

A set of evaluable tasks that will consist of activities of individual accomplishment will be proposed to the student throughout the semester. These tasks will be eminently practical and must be delivered throughout the development of the subject. The tasks will be assessed both in terms of the results obtained and the process and presentation of them.

###### b. Laboratory practices (20%)

The performance and the use of the students in the practical sessions will be monitored. For the evaluation the materials of the result of the practices will be collected, which will be delivered to the responsible teacher, and the observation of the development capacity of the techniques proposed by the students.

###### c. Final course work (60%)

The student must carry out a practical work of the subject in which different solutions and practical applications of audiovisual technologies and audio and video systems will be implemented. The content and objectives of the work will be agreed with the students and will adapt to the time and credits available in the subject. It will be obligatory to make an oral presentation of the work during the class schedule. The evaluation of the work will be carried out according to the following criteria:

- Objectives and scope of work (10%)
- Analysis of the state of the art (20%)
- Technological implementation and contributions made (35%)
- Achievement of the objectives (20%)
- Oral and written presentation of the work (15%)

The evaluation of the coursework will be completed with a self-evaluation of both the student's work group and the rest of the groups. The self-evaluation will be based on a simple rubric provided by the teacher.

Students who pass the subject through continuous assessment tests will not have to take the global test. The subject is exceeded with 5 points out of 10.

##### 2) Global test (official calls)

In the two official examinations, the overall evaluation of the student will be carried out through a written final exam valued at 0 to 10 points (100%). The exam will consist of a written test in which the theoretical and practical knowledge of the subject will be assessed and will be carried out in the hours and classrooms arranged by the Center.

The subject is passed with a rating of 5 points out of 10.

### 4. Methodology, learning tasks, syllabus and resources

#### 4.1. Methodological overview

**The learning process that is designed for this subject is based on the following:**

**Class work:** 2.4 ECTS (60 hours)

1. Participatory Lectures (45 hours)
2. Laboratory practices (15 hours)

**Personal work:** 3.6 ECTS (90 hours)

3. Carrying out evaluable tasks
4. Performing practical work and supervised
5. Study
6. Personal attention
7. Evaluation tests.

## 4.2. Learning tasks

The learning process that is designed for this subject is based on the following:

**Classwork:** 2.4 ECTS (60 hours)

**1. Participatory Lectures** (45 hours) in which the theoretical foundations of the contents of the subject are presented and where student participation is encouraged. The presentation of bibliographic material previously delivered to the student (or deposited in the computer means provided by the University for this purpose) and its development on the board for proper follow-up will be combined.

**2. Laboratory practices** (15 hours) in which students will perform 5 sessions of practices 3 hours in labs Ada Byron Building. In small groups, a training series related to the contents of the subject and to consolidate the set of theoretical concepts are made. This activity will be conducted in the laboratory in person.

**Personal work:** 3.6 ECTS (90 hours)

**3. Performance of evaluable tasks.** Tasks of an individual nature to be carried out throughout the four-month period, with a sharing and assessment in the classroom.

**4. Performing a practical work tutored** by teachers, based on the contents of the subject and related technologies and audiovisual systems. Possibility of attending seminars related to the topic mentioned with the participation of external guests to them.

**5. Study.**

**6. Personalized attention to students through tutorials.**

**7. Evaluation tests.**

## 4.3. Syllabus

The course will address the following topics:

PART I.

1. Introduction

History of Digital Audio  
Audio equipment  
Speakers and microphones

2. Fundamentals of Digital Audio

AD and DA conversion

3. Magnetic and optical media: CD, MD, DCC, DAT, DVD

4. Perceptual Coding

5. Audio communication protocols

PART II.

6. Introduction to Video

Color representation  
Fundamentals of video systems

7. Camcorders

8. Monitors & Displays

9. Video Recorders

Professionals

Domestic and semi-professional

10. Video post-production systems

### PROGRAMMING LABORATORY PRACTICE AND SEMINARS

Throughout the course, a number of practices will be conducted in order to verify in the laboratory the concepts of the subject. The possibility of holding a seminar.

Practice 1. Openframeworks (I)

Practice 2. Openframeworks (II)

Practice 3. Openframeworks (III)

Practice 4. Openframeworks (IV)

Practice 5. Audiovisual installations (I)

Practice 6. Audiovisual installations (II)

## 4.4. Course planning and calendar

Schedule sessions and presentation of works

The schedule of the course, both of the master classes and the laboratory sessions, will be determined by the academic

calendar that the center established for the corresponding course.

The oral presentation of the assignments will be made during the last teaching week planned in the academic calendar planned by the Center.

#### **4.5. Bibliography and recommended resources**

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=31002>

Similarly, and taking into account the digital media provided by the University of Zaragoza, students enrolled in the course will be provided with access to a set of LESSON NOTES prepared by the teachers in charge.