30331 - Audio and Video Electronic Systems

Syllabus Information

Academic Year: 2020/21

Subject: 30331 - Audio and Video Electronic Systems

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 438 - Bachelor's Degree in Telecomunications Technology and Services Engineering

ECTS: 6.0

Year: 4

Semester: First semester

Subject Type: ---

Module: ---

1.General information

1.1.Aims of the course

The main objective of the subject "Electronic Audio and Video Systems" is to provide the student with the set of theoretical knowledge, cutting-edge techniques and complete systems necessary for the acquisition, processing, coding and editing of audio and video.
They will be studied, primarily, completely digital systems and there will be a description of the elements that compose them.
The objective is for the student to be able to approach the design of digital audio / video systems at the level of discrete subsystems, understanding the peculiarities and commitments that such signals entail and with sufficient knowledge of the technological elements available for this purpose.
To this end, the set of fundamental objectives can be summarized as follows:

- Know the audio and video systems, their typology, planning, main uses and historical perspective.
- Know the audio and video signals, their structure and their electronic transmission layer.
- Know the interconnection and wiring technologies, the electronic blocks and the control of audio and video systems.
- Know the uses, technologies and specifications of professional audio and video installations.

1.2.Context and importance of this course in the degree

The subject "Electronic audio and video systems" is part of the Electronic Systems itinerary, in particular, it is part of the Electronic Systems Technology subject.
Audio video systems represent a good example of the integration of different technologies, both electronic and of signal processing and transmission, both analogue and digital. Through this subject the student will have access to the necessary technological knowledge to understand, analyze and select the most appropriate systems for an audiovisual professional environment.
The concepts and knowledge developed allow the student to strengthen the relationships between different subjects of the degree and assess the importance of the interrelation of technologies when developing an audiovisual system.
The subject, within the degree, maintains a direct relationship with previous basic subjects, especially with "Analog Electronics", "Digital Electronics", "Communications Electronics", "Digital signal processing" and "Propagation and transmission methods", as it is commented in the section of recommendations to attend the subject.
In addition, this subject would be a fundamental requirement to be able to study other subjects of audiovisual content of the degree.

1.3.Recommendations to take this course

The course will be taught by teachers of the Electronic Technology Area of ??the Department of Electronic Engineering and Communications.
To follow this course normally, it is advisable that the student has previously studied the basic subjects of first and second.
The knowledge of the subjects "Analog Electronics", "Digital Electronics", "Communications Electronics", "Digital signal processing" and "Propagation and transmission methods" is especially recommended.
On the other hand, the student is advised to actively attend classes (both theory and problems), and to complete the practicals. In the same way, the student is recommended to take advantage of and respect the teacher's tutoring schedules to resolve possible doubts. The subject presents an important percentage of practical content and personal work so it is strongly advised to continuously monitor the proposed activities.

2.Learning goals

2.1.Competences

Upon passing the subject, the student will be more competent to ...

- Conceive, design and develop projects in engineering (C1)
- Solve problems and make decisions with initiative, creativity and critical reasoning (C4)
- The management of information, management and application of technical specifications and legislation necessary for the practice of Engineering (C9)
- Build, operate and manage systems for capturing, transporting, representing, processing, storing, managing and presenting multimedia information, from the point of view of electronic systems (CSE1)
- Apply electronics as a support technology in other fields and activities, and not only in the field of Information and Communication Technologies (CSE4)

2.2.Learning goals

The student, to pass this subject, must demonstrate the following results ...
- It is capable of building, exploiting and managing systems for capturing, transporting, representing, processing, storing, managing and presenting multimedia information, from the point of view of electronic systems.
- Understand and know how to apply the fundamentals of signal coding in audio and video systems.
- It has the ability 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.
- It efficiently uses knowledge about audiovisual systems and standards in the design of specific electronic systems in the audiovisual field.
- Master the laboratory instruments and the control of the specialized equipment in audiovisual information.
- Understand the fundamentals of the transmission of multimedia content and its possible applications.

2.3.Importance of learning goals

The basic understanding of the subject "Electronic Audio and Video Systems", as well as the principles on which this subject is based, is important for the exercise of the competences of a graduate in Telecommunications Technology and Services Engineering and, in particular, for those students who want to develop their skills in the knowledge and design of audiovisual systems, of such importance nowadays.The subject is based on providing the student with the knowledge, skills and competences to understand the audiovisual equipment in terms of its use, design, selection or management.The subject "Electronic Systems of Audio and Video" also allows to apply the knowledge of the subjects of the electronic technology and technologies of the previous communications (Fundamentals of Electronics, Analogic Electronics, Digital Electronics, Electronic Systems with Microprocessors, Electronics of Communications, Digital Processing of Signals, Propagation and Transmission Methods), not only from the formal point of view, but in its concrete application to an audiovisual equipment.This dynamic can be completed in subsequent optional subjects of audiovisual content and in the completion of the final degree project.

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
2. History of Digital Audio
3. Audio equipment
4. Speakers and microphones
5. Fundamentals of Digital Audio
6. AD and DA conversion
7. Magnetic and optical media: CD, MD, DCC, DAT, DVD
8. Perceptual Coding
9. Audio communication protocols
PART II.
1. Introduction to Video
2. Color representation
3. Fundamentals of video systems
3. Camcorders
4. Monitors & Displays
5. Video Recorders
    Professionals
    Domestic and semi-professional
6. 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://biblos.unizar.es/br/br_citas.php?codigo=30331&year=2019

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.