COURSE DATA

DATA SUBJECT

Code: 36481
Name: Audio systems
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1407 - Degree in Multimedia Engineering	Escola Tècnica Superior d'Enginyeria	3	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1407 - Degree in Multimedia Engineering	Gráficos y Audio por Computador	COMPULSORY

COORDINATION

COBOS SERRANO MAXIMO

SUMMARY

"Audio Systems" is a third year course that is part of the body of compulsory courses of the Degree in Multimedia Engineering. It complements other courses of the Degree under the subject "Computer Graphics and Audio" and others related to the production of audiovisual content in the subject "Audiovisual Production", offering a broad perspective of sound engineering and its role in current content creation.

The course is motivated by the major change that sound engineering has experienced with the advent of digital technologies. These have greatly facilitated the access of many users to music recording equipment, unthinkable years ago when the only way to record music was in a professional recording studio. However, new generations of recording devices and the characteristics of today's computers, make it perfectly possible to create a personal recording studio with the capability to make professional-quality productions. The objective of this course is to introduce the student to sound engineering and audio systems related to the capture, recording, processing and reproduction of sound.

The contents of the course can be grouped into four distinct blocks. The first provides an introduction to the physics of sound and its perception, psychoacoustics and digital audio systems. The second section focuses on electroacoustic systems for the capture and reproduction of sound, reviewing the different transduction principles thereof and providing the student with a comprehensive view of their physical and electrical specifications. The third part is devoted to signal processing systems that accompany the

production of audio systems such as dynamic and temporal processors. Finally, students are introduced to the process of content creation, understanding different aspects and techniques related to recording, editing, mixing and mastering audio tracks.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

Mathematics I
Multimedia information
Audiovisual production and editing

COMPETENCES / LEARNING OUTCOMES

1407 - Degree in Multimedia Engineering

G1 - Be able to relate and structure information from different sources and to integrate ideas and knowledge. (RD1393/2007)

G2 - Have the learning skills needed to undertake further studies or to gain further training with a certain degree of autonomy. (RD1393/2007)

G3 - Take into account the economic and social context in engineering solutions, be aware of diversity and multiculturalism and ensure sustainability and respect for human rights and equality between men and women.

G4 - Be able to integrate into working groups and collaborate in multidisciplinary environments and be able to communicate properly with professionals from all fields.

G5 - Be able to lead working groups properly, respect and appreciate the work of others, take into account the needs of the group and be available and accessible.

I10 - e able to design and evaluate human-computer interfaces that ensure accessibility and usability of computer systems, services and applications.

MM10 - Be able to analyse and integrate software components to develop multimedia applications.

MM11 - Have knowledge and ability to apply the different mechanisms and elements to create both linear and non-linear audiovisual stories according to different production formats, technologies and media.

MM12 - Know current 2D and 3D graphic systems and their application to multimedia developments.

MM13 - Know and be able to use the techniques of digital audio and directional audio systems that can be integrated into multimedia applications.

MM15 - Be able to respond professionally to the requirements at each step of a multimedia production process: show skills for preparing and understanding scripts and communication, graphic design for communication, management of streaming technology, web design and production and post-production processes.

MM16 - Have theoretical and practical knowledge of the technologies applied to audiovisual media (photography, radio, sound, television, video, film and multimedia).

MM18 - Know the basic tools available for creating multimedia contents including high-definition video and audio.

MM1 - Have knowledge and ability to understand essential facts, concepts, principles and theories related to multimedia systems including all the disciplines covered by these systems.

MM21 - Communicate effectively, both in writing and verbally, knowledge, procedures, results and ideas related to ICT and specifically to multimedia, and know their socioeconomic impact.

MM24 - Be able to design, develop, evaluate and ensure the accessibility, ergonomics, usability and security of multimedia systems, services and applications and of the information that these manage.

MM28 - Be able to solve problems with initiative, decision-making and creativity and to communicate and transmit the knowledge, abilities and skills of a multimedia engineer.

MM2 - Be able to understand and manage the different technologies involved in multimedia systems, both from the point of view of hardware and electronics and of software.

MM3 - Be able to implement methodologies, technologies, processes and tools for the professional development of multimedia products in a real context of use by applying the appropriate solutions for each environment.

MM5 - Know how to apply the theoretical and practical resources to deal with a multimedia application as a whole.

MM7 - Be able to apply the principles of audiovisual graphic design and communication to multimedia products.

MM8 - Integrate knowledge of different multimedia technologies to create products that offer global solutions that are appropriate to each context.

MM9 - Program correctly in the different specific languages of multimedia systems taking into account time and cost restrictions.

DESCRIPTION OF CONTENTS

1. Fundamentals of acoustics

Physical Acoustics. Physiological acoustics. Architectural acoustics.

2. Basic specifications in audio systems

Basic electrical quantities. Use of the decibel. Electric specifications.

3. Spectral analysis of sound

Signals. Types of signals. Fourier analysis. Examples

4. Capturing and monitoring

Microphones. Loudspeakers. Amplifiers. Cables and connectors.

5. Signal Processors

Dynamics processors. Frequency processors. Delay processors. Synthesis

6. Recording and mixing

Digital audio workstations (DAWs). Home-studios. Microphone techniques. Introduction to mixing and mastering.

7. Spatial audio

Multichannel surround systems. Binaural audio. Current 3D formats.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Laboratory	20,00
Classroom practices	10,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	10,00
Independent study and work	30,00

Preparation of lessons	25,00
Preparation for assessment activities	10,00
Resolution of case studies	15,00
Total hours	**90,00**

TEACHING METHODOLOGY

1) Work at the course:

a) Theory sessions, including short activities for the students.

b) Problem solving sessions, to practice the concepts from the theory sessions.

c) Lab sessions, understanding by means of simulations the most important concepts from the theory sessions.

2) Student's own work:

a) Homework and exposition in class of the solution.

b) Exam preparation.

c) Lab sessions preparation, reading the lab description and the related theoretical concepts.

3) Consulting sessions: A certain number of hours are established each week, which the students can attend in order to solve doubts

EVALUATION

The course evaluation follows a modified conventional approach, not reaching a full continuous-time evaluation. The following items are considered:

- Result of the partial exam (40% of the final mark)
- Attendance and completion of lab sessions (20% of the final grade) (Non-recoverable)
- Lesson questionnaires (30% of the final mark)
- Attention and participation in theory classes (10% of the final grade) (Non-recoverable)

At the end of each lesson a quizz will be conducted in class. The quizz will take place the next class day following the end of the lesson, so that students have a chance to prepare it properly. The results obtained throughout the different quizzes are a very important aspect of the evaluation.

For the students who cannot attend the course lessons, an alternative evaluation is proposed, where the

attendance is replaced by solving additional homework.

The minimum mark required to pass the course is 5 over 10 in both the partial exam and homeworks. The remaining items are not subjected to a minimum.

To evaluate the attendance, the student needs to attend at least 75% of the course lessons.

In the second evaluation of the course, two options are possible:

- Final exam (70%)

- Partial exam (40%) + Lesson questionnaires (30%)

The student must choose this option before taking the second exam.

In any case, the evaluation will be in agreement with the *Reglament d'avaluació i qualificació de la Universitat de València per a títols de grau i de màster*, adopted in the Consell de Govern session on may 30th, 2017. (ACGUV 108/2017).

Copying or plagiarism of any activity that is part of the evaluation will result in the impossibility of passing the course, and the student will then be subject to the appropriate disciplinary procedures indicated in the ACTION PROTOCOL FOR FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA (ACGUV 123/2020).

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REFERENCES

- Huber, David M. and Runstein, Robert E., Modern Recording Techniques, 8th edition, Focal Press, 2013. ISBN: 0240821572
- Bartlett, Bruce, and Bartlett, Jenny, Practical Recording Techniques: The Step-by-step Approach to Professional Audio Recording, 6th edition, Focal Press, 2012. ISBN: 024082153X
- Ballou, Glen, Handbook for Sound Engineers, 4th edition, Focal Press, 2008. ISBN: 0240809696
- Toole, Floyd, Sound Reproduction: The Acoustics and Psychoacoustics of Loudspeakers and Rooms, Focal Press, 2008. ISBN: 0240520092
- Davis, Gary and Jones, Ralph, The Sound Reinforcement Handbook, Yamaha, 1988. ISBN: 0881889008