



## Course guide

### 230027 - CCAV - Audiovisual Coding

**Last modified:** 24/05/2024

**Unit in charge:** Barcelona School of Telecommunications Engineering  
**Teaching unit:** 739 - TSC - Department of Signal Theory and Communications.

**Degree:** BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Optional subject).

**Academic year:** 2024    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish

#### LECTURER

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**Coordinating lecturer:** FERNANDO MARQUES ACOSTA

**Others:**

Primer quadrimestre:  
CARLOS LOPEZ MARTINEZ - 11  
FERNANDO MARQUES ACOSTA - 11  
ALBINO NOGUEIRAS RODRIGUEZ - 11

Segon quadrimestre:  
ALBERTO ALONSO GONZÁLEZ - 41  
CARLOS LOPEZ MARTINEZ - 41  
FERNANDO MARQUES ACOSTA - 41

#### REQUIREMENTS

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PROCESSAMENT D'ÀUDIO I VEU - Corequisit  
PROCESSAMENT D'IMATGE I VÍDEO - Corequisit

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Generical:**

12 CPE N3. They will be able to identify, formulate and solve engineering problems in the ICC field and will know how to develop a method for analysing and solving problems that is systematic, critical and creative.

#### TEACHING METHODOLOGY

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## LEARNING OBJECTIVES OF THE SUBJECT

The aim of this subject is twofold. First, the student is given the knowledge about the basic tools used in any audiovisual signal coding system, highlighting both the aspects related to the redundancy present in the signal (information theory) and the relevance of information to the end user (perception theory). Second, it studies how these tools are used in specific cases of current audiovisual standards and the conditions that have imposed these standards as well as the usefulness of each of them.

Learning outcome:

The student has the ability to build, operate and manage telecommunications services and applications, in particular those related to audiovisual services and multimedia applications, including capture systems, analog and digital processing, coding, transport, representation, processing, storage, reproduction, management and presentation of such services and applications.

The student is familiar with the analysis, specification, design, implementation, operation and maintenance of equipment, headers and installations for television, audio and video, both in fixed and mobile environments.

The student is able to carry out projects of premises and facilities for the production and recording of audio and video signals.

The student has the capacity to create, encode, manage, disseminate and distribute multimedia content, meeting the criteria of usability and accessibility of audiovisual, broadcasting and interactive services.

The student identifies and models complex systems. Carries out qualitative analyzes and approximations, establishing the uncertainty of the results. The student raises hypotheses and experimental methods to validate them. The student identifies key components and establishes commitments and priorities.

The student applies the skills acquired to carry out a task autonomously. The student identifies the need for lifelong learning and develops his/her own strategy for doing so.

## STUDY LOAD

Type	Hours	Percentage
Self study	85,0	56.67
Hours small group	13,0	8.67
Hours large group	52,0	34.67

**Total learning time:** 150 h

## CONTENTS

### (ENG) Topic 1. Introduction and Basic Principles of Coding

#### Description:

Transformed and predicted methods. Quantization. Entropy coding.

Laboratori: Introduction

**Full-or-part-time:** 6h

Theory classes: 2h

Laboratory classes: 2h

Self study : 2h

### (ENG) Tema 2. Codificació entròpica

**Description:**

Entropy coding: scalar and vector Huffman codes

Aplication: Group 3, Group 4

Entropy coding: Arithmetic coding

Aplication: JBIG

Laboratory: Entropy coding

**Specific objectives:**

**Full-or-part-time:** 14h

Theory classes: 6h

Laboratory classes: 2h

Self study : 6h

### (ENG) Tema 3. Codificació de veu

**Description:**

**Full-or-part-time:** 26h

Theory classes: 12h

Laboratory classes: 2h

Self study : 12h

### (ENG) Tema 4. Codificació d'àudio

**Description:**

**Full-or-part-time:** 22h

Theory classes: 10h

Laboratory classes: 2h

Self study : 10h

### (ENG) Tema 5. Codificació d'imatge

**Description:**

**Full-or-part-time:** 18h

Theory classes: 8h

Laboratory classes: 2h

Self study : 8h

### (ENG) Tema 6. Codificació de vídeo

**Description:**

**Full-or-part-time:** 22h

Theory classes: 10h

Laboratory classes: 2h

Self study : 10h

## ACTIVITIES

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### (ENG) Pràctica de laboratori

**Full-or-part-time:** 2h

Laboratory classes: 2h

### (ENG) Pràctica de laboratori

**Full-or-part-time:** 2h

Laboratory classes: 2h

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Laboratory classes: 2h

### (ENG) Pràctica de laboratori

**Full-or-part-time:** 2h

Laboratory classes: 2h

### (ENG) Pràctica de laboratori

**Full-or-part-time:** 2h

Laboratory classes: 2h

### (ENG) Proves de resposta llarga (Examen Final)

**Full-or-part-time:** 1h

Theory classes: 1h

## GRADING SYSTEM

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## EXAMINATION RULES.

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## BIBLIOGRAPHY

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### Basic:

- Bonafonte, A.; Marques, F. Apunts de l'assignatura [on line]. [Consultation: 13/05/2020]. Available on: <https://atenea.upc.edu/login/index.php>.

### Complementary:

- Taubman, D.S.; Marcellin, M.W. JPEG2000: image compression fundamentals, standards and practice. Boston; Dordrecht; London:



Kluwer Academic Publishers, 2002. ISBN 079237519X.

- Bosi, M.; Goldberg, R.E. Introduction to digital audio coding and standards. Boston: Kluwer Academic Publishers, 2003. ISBN 1402073577.

- Chu, Wai C. Speech Coding Algorithms: Foundation and Evolution of Standardized Coders. 1. Wiley Science, 2003. ISBN 0471373125.

- Dutoit, T.; Marques, F. Applied signal processing: a MATLAB-based proof of concept [on line]. New York: Springer, 2009 [Consultation: 30/06/2022]. Available on: <https://link-springer-com.recurtos.biblioteca.upc.edu/book/10.1007/978-0-387-74535-0>. ISBN 9780387745343.