



POLITÉCNICA

INTERNATIONAL
CAMPUS OF
EXCELLENCE

COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001



E.T.S. de Ingeniería y Sistemas
de Telecomunicación

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

593000413 - Advanced Audiovisual Coding

DEGREE PROGRAMME

59AF - Master Univ. Ing. Sistemas y Servicios para la Sociedad de la Información

ACADEMIC YEAR & SEMESTER

2020/21 - Semester 2

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1. Description

1.1. Subject details

Name of the subject	593000413 - Advanced Audiovisual Coding
No of credits	5 ECTS
Type	Optional
Academic year of the programme	First year
Semester of tuition	Semester 2
Tuition period	February-June
Tuition languages	English
Degree programme	59AF - Master Univ. Ing. Sistemas y Servicios para la Sociedad de la Informacion
Centre	59 - Escuela Tecnica Superior de Ingenieria y Sistemas de Telecomunicacion
Academic year	2020-21

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Fernando Pescador Del Oso (Subject coordinator)	A4217	fernando.pescador@upm.es	Sin horario.
Matias Javier Garrido Gonzalez	A4209	matias.garrido@upm.es	Sin horario.

Miguel Chavarrias Lapastora	A4406	miguel.chavarrias@upm.es	Sin horario.
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* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

The subject - recommended (passed), are not defined.

3.2. Other recommended learning outcomes

- Basic knowledge on microprocessors
- Basic knowledge on "C" language
- Basic knowledge on digital video

4. Skills and learning outcomes *

4.1. Skills to be learned

CB10 - To have the learning abilities to continue studying in a mostly self-guided or autonomous manner.

CB7 - To be capable of applying the students' acquired knowledge, as well as their problem solving abilities, to new or not well-known environments in broader (or multidisciplinary) contexts that are in the framework of their expertise area

CE 1 - To be capable of analyzing, interpreting and applying standards related to the ICT

CE 7 - To be capable of proposing, organizing and executing research works in the framework of the Information Society engineering

CESE 14 - To be capable of analyzing and developing processing techniques to enhance audio and video signals

CGEN 4 - To be capable of planning, calculating and designing systems and services for the Information Society

4.2. Learning outcomes

RA11 - Ability to analyze and design systems and services for the Information Society

RA20 - Analyze and apply common transforms to audio and video signals

RA31 - Shape the hardware architecture of a digital system

RA27 - Analyze embedded systems, the technologies needed by them and the theoretical foundations for their systematic design

RA24 - Select and apply enhancement methods for images

RA50 - Ability to understand the new video standards and some of the available implementations

RA10 - Improvement of the skills for autonomous learning

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

This course is divided in 3 chapters.

Chapter 1: Introduction to new video coding standards (H264, HEVC and FVC) and multicore platforms

Chapter 2: Implementation of video decoders using RVC

Chapter 3: Design of an application using multicore platform and new video coding standards

5.2. Syllabus

1. Introduction to new video coding standards
 - 1.1. Fundamentals of advanced video coding
 - 1.2. The H264 standard
 - 1.3. The HEVC standard
 - 1.4. The FVC standard
2. Multicore platforms
 - 2.1. DSP-based architectures
 - 2.2. Other multicore platform
3. Implementation of video decoders using RVC
 - 3.1. Introduction to RVC and the Orcc compiler
 - 3.2. HEVC-RVC based decoders
 - 3.3. Performance analysis of an HEVC decoder
 - 3.4. Tutorial of the RVC-based decoder
4. Final Application Design

6. Schedule

6.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Distant / On-line	Assessment activities
1	Introduction to new video coding standards Duration: 01:30	Introduction to new video coding standards Duration: 01:30		
2	The H264 standard Duration: 01:30	The H264 standard Duration: 01:30		
3	The HEVC standard Duration: 02:00	The HEVC standard Duration: 01:00		
4	Multicore platforms Duration: 01:00 DSP Architectures Duration: 01:00	Multicore platforms Duration: 01:00		
5	Introduction to RVC and CALL language Duration: 01:30	Introduction to RVC and CALL language Duration: 01:30		
6	Dataflow programing Duration: 01:30	Dataflow programing Duration: 01:30		
7	Dataflow programing Duration: 01:30	Dataflow programing Duration: 01:30		
8	HEVC RVC decoder Duration: 01:30	HEVC RVC decoder Duration: 01:30		
9		Implementation of a video decoder Duration: 03:00		
10		Implementation of a video decoder Duration: 03:00		Results presentation Continuous assessment Presential Duration: 01:00
11		Final design Duration: 03:00		
12		Final design Duration: 03:00		

13		Final design Duration: 03:00		
14		Final design Duration: 03:00		
15		Final design Duration: 03:00		
16				Presentations Continuous assessment Presential Duration: 01:00
17				Final exam: only if student fails continuous assessment Final examination Presential Duration: 03:00

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The schedule is based on an a priori planning of the subject; it might be modified during the academic year, especially considering the COVID19 evolution.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
10	Results presentation		Face-to-face	01:00	50%	5 / 10	CE 1 CB7 CB10 CGEN 4 CESE 14 CE 7
16	Presentations		Face-to-face	01:00	50%	5 / 10	CE 1 CB7 CB10 CGEN 4 CESE 14 CE 7

7.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	Final exam: only if student fails continuous assessment		Face-to-face	03:00	100%	5 / 10	CE 1 CB7 CB10 CGEN 4 CESE 14 CE 7

7.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

7.2. Assessment criteria

The students must present the results achieved in the two designs that are proposed during the semester

The students must obtain more than 5/10 points in each of the presentations

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Scientific Papers	Bibliography	
HW platforms	Equipment	
SW development platforms	Equipment	
Video sequences and analysis tools	Equipment	