

## COURSE SYLLABUS 2018-19

### Basic information on the course

Course:	Multimedia Technologies		
Course code:	40154321	Plan:	Grado en Ingeniería Informática (Plan 2015)
Academic Year:	2018-19	Undergraduate/Graduate:	Undergraduate
Degree Year:	4	Type:	Optative
Duration:	First semester		

### TIME DISTRIBUTION ACCORDING TO REGULATIONS

Credits: 6

Total time: 150

### USE OF LEARNING PLATFORM:

### TEACHERS

Name	Vicente González Ruiz		
Department	Informática		
Building	CITE III		
Office	1.52		
Telephone	E-mail (institutional)	vruiz@ual.es	
Website	http://www.ual.es/~vruiz		

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Department			
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Office			
Telephone	E-mail (institutional)		
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## OTHER IMPORTANT INFORMATION

### Content justification

The generation, storage, processing, transmission and reproduction of multimedia content are increasingly frequent processes in many information systems. In this context, the creation of multimedia content manipulation tools is a key aspect in the preparation of the computer engineer. For these reasons, in the subject of Multimedia Technologies students study a set of contents that merge aspects related to the transmission of data over packet switching networks (Internet generally) and the capture / encoding / reproduction of audio and video in real time.

### Courses related in Study Plan

- \* Servicios en las Tecnologías de la Información (Tecnologías Web y Tecnologías Multimedia).
- \* Tecnologías de comunicación y seguridad (Transmisión de Datos y Redes de Computadores, y Seguridad Informática).
- \* Teoría de códigos y criptografía (Teoría de Códigos y Criptografía).
- \* Sistemas operativos, Sistemas distribuidos y redes y arquitectura de computadores (Sistemas Operativos, Fundamentos de Redes de Computadores, y Arquitectura de Computadores).
- \* Tecnologías de acceso a la información (Periféricos e Interfaces, Tecnologías de Acceso a Red).

### Pre-required knowledge

None

## COMPETENCES

### General competences

#### Key competences University of Almeria

- CT04: Teamwork.

#### Basic competences

- CB7: Application of knowledge. Students should be able to apply acquired knowledge and problem solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

### Specific competences

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- T11: Ability to understand the environment of an organization and its needs in the field of information technologies and communications. In real time.
- T16: Ability to conceive systems, applications and services based on network technologies, including Internet, web, e-commerce, multimedia, interactive services and mobile computing.

## LEARNING OUTCOMES

1. Socket programming.
2. Formats and multimedia streaming.
3. Collaborative application development.

## COMPETENCY ASSESSMENT

### Criteria and assessment tools

CT04: Teamwork.

This competence is evaluated when the students (working a physical team or not, are virtually always in a single group in the participative platform), develop each of the "issues" raised in the subject. It is also evaluated in class, when the solutions to the issues are scored.

CB7: Application of knowledge. That the students know how to apply the acquired knowledge and their Ability to solve problems in new or little-known environments Within broader (or multidisciplinary) contexts related to their study area.

The students approach the projects based on the knowledge acquired during the theory and practical classes, in which they help to solve the different problems that arise during the realization of the project. However, this feedback from the teachers only helps to guide the students. They are the ones who, during the development of the project, need to apply the knowledge to be able to carry out the assigned project.

T11: Ability to understand the environment of an organization and its needs in the field of information technologies and communications. In real time.

Students approach real projects, some proposed by the faculty and others proposed by them. Since these are projects framed within other broader contexts (continuation of previous projects, socially interesting projects, etc.), it is necessary that the students, especially if they are the ones who propose the projects, understand very well the requirements of the projects. In addition, since all the students of the subject are regularly followed up on all the projects, through the development of presentations of the work done up to that moment and a brainstorming session is carried out, all the students show (in this case mainly spoken form) its capacity to contribute ideas or indicate weaknesses / strengths of its projects and of its companions. In addition, different tools are used (Virtual Campus, Issues in GitHub, Slack) that facilitate the interaction between the students and the teacher (s), and that help to quantify the students' ability to understand the technological needs of their students. environment.

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TI6: Ability to conceive systems, applications and services based on network technologies, including Internet, web, e-commerce, multimedia, interactive services and mobile computing.

In Multimedia Technologies, aspects related (mainly) to systems, applications and multimedia services are covered. Therefore, all projects have this factor in common. Since the successful development of the projects depends directly on the ability of the students to conceive them, this competence is evaluated by quantifying the number and quality of the objectives achieved, which on the other hand are in most cases defined by the students during the process of defining objectives to be carried out in their projects. Students, working in groups of up to 4 people, commit to send \*\* PRs \*\* (extraction requests) to a project hosted on GitHub, in order to obtain a score for the topic. This year, the project is the development of a [\* Real-time multimedia intercom \*] (<https://github.com/Tecnologias-multimedia/intercom>).

#### Follow-Up Mechanisms

- Attendance to tutorials.
- Participation in communication tools (discussion forums, emails).
- Others:
  - Periodic interviews.
  - Activity recorded in the collaborative development platforms:
    - Sistemas multimedia at GitHub: <https://github.com/Tecnologías-Multimedia>.
    - Sistemas multimedia en Slack: <https://tec-multimedia-ual.slack.com>.

#### COURSE MATERIALS

##### Recommended course materials

1. Background.
  - a. The fork and branch git workflow.
  - b. Yet another Python tutorial.
  - c. Pyramids and wavelets.
  - d. Advanced Linux Sound Architecture (ALSA).
  - e. JACK (JACK Audio Connection Kit).
  - f. MilkyTracker.
  - g. FFMPEG.
  - h. Blender.
  - i. LaTeX.
  - j. Audacity.
  - k. Pure Data.
2. Audio-visual perception.
  - a. The sound.
  - b. The human auditory system.
  - c. Human sound perception.
  - d. The light.

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- e. The human visual system.
- f. Human light perception.
- 3. Audio-visual transduction.
  - a. Audio transduction systems.
  - b. Video transduction systems.
- 4. Signal digitization.
  - a. Harmonic analysis.
  - b. Sampling.
  - c. Quantization.
- 5. Encoding.
  - a. Probabilistic models.
  - b. Huffman coding.
  - c. Arithmetic coding.
  - d. Differential coding.
  - e. Transform coding.
  - f. Media encoding models.
- 6. Transmission.
  - a. Multimedia transmission.
  - b. Business model on the Internet.
  - c. Data delivery models.
  - d. Media streaming models.
  - e. Quality of Service. Icecast.

Course materials available in UAL's library

1. Behrouz A. Forouzan and Firouz Mosharraf. Computer networks: a top-down approach. McGraw-Hill. 2012.
2. K.R. Rao, J.J. Hwang. Techniques and standards for image, video, and audio coding. Prentice Hall. 1996.
3. Wesley Hales. HTML5 and JavaScript Web Apps. O'Reilly Media. 2012.
4. Xiph. Org Foundation. Xiph Org Projects: Vorbis, Ogg, Free Lossless Audio Codec, Speex, Theora, Use of Ogg Formats in Html5. Books LLC (General Books). 2010.
5. Books, LLC. Audio Codecs: MP3, MPEG-4, MPEG-1, MPEG-2, Vorbis, Windows Media Audio, Audio Codec, Linear Predictive Coding, MPEG-3, Adaptive Transform Acoustic Coding, Dolby Digital, Speex, LAME, RealAudio, G.711, Mu-law Algorithm, G.723.1, A-law Algorithm. Books LLC (General Books). 2011.
6. Rafael C. González, Richard E. Woods, Upper Saddle River. Digital image processing. Prentice Hall. 2008.
7. Turnquist, Greg Lee. Spring Python 1.1 create powerful and versatile Spring Python applications using pragmatic librarie. Birmingham, U.K. : Packt Open Source. 2010.
8. Christopher Schmitt, Kyle Simpson,. HTML5 Cookbook. O'Reilly Media. 2011.
9. Steve Fulton, Jeff Fulton. HTML5 Canvas. O'Reilly Media. 2013.
10. Banerji, A. Multimedia Technologies. McGraw-Hill Education (India) Pvt Limited. 2010. Ninad Sathaye. Python Multimedia. PACKT Publising. 2010.
11. Dusty Phillips. Python 3 Object Oriented Programming. PACKT Publising. 2010.

WEBSITE

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- <https://tecnologias-multimedia.github.io>

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