

**COURSE DATA****Data Subject**

<b>Code</b>	34843
<b>Name</b>	Multimedia programming
<b>Cycle</b>	Grade
<b>ECTS Credits</b>	6.0
<b>Academic year</b>	2021 - 2022

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
1400 - Degree in Computer Engineering	School of Engineering	4	Second term
1407 - Degree in Multimedia Engineering	School of Engineering	3	Second term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
1400 - Degree in Computer Engineering	16 - Optional subject	Optional
1407 - Degree in Multimedia Engineering	10 - Programación Multimedia	Obligatory

**Coordination**

<b>Name</b>	<b>Department</b>
COMA TATAY, INMACULADA	240 - Computer Science

**SUMMARY**

This is a third year subject of the Multimedia Degree that takes place on the second semester. The course aims at providing students with an overview of the development environments commonly used to create applications and multimedia content. We follow an approach based on a dual perspective.

On the one hand, we will study the multi-media programming environments based on markup languages; from the creation of effects and animations, the integration of audio and video, as well as the integration of 2D and 3D graphics .

On the other hand, the development of interactive applications using scripting languages will be covered. Therefore, we will deal with issues such as: synchronization and advanced content adaptability, data visualization and creation of interactive content in Flash.



The overall objectives of this course are that students:

- Are able to identify different environments devoted to develop multimedia systems, as well as list their advantages and disadvantages
- Are able to design and develop moderately complex applications and multimedia content through markup languages.
- Are able to design and develop moderately complex applications and multimedia content through scripting languages.

## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

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

### Other requirements

It is recommended to have attended first year courses on Computer, Programming and Hypermedia Programming. This course assumes that students have acquired the programming skills taught in first year courses.

## COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

### 1400 - Degree in Computer Engineering

- SI3 - Ability to actively participate in the specification, design, implementation and maintenance of information and communication systems.

### 1407 - Degree in Multimedia Engineering

- B4 - Have basic skills in the use and programming of computers, operating systems, databases and computer software for use in engineering.
- B5- Know the structure, organisation, operation and interconnection of computer systems, the fundamentals of their programming and their application to solve engineering problems.
- I1- Know and be able to apply basic computer algorithmic procedures to design solutions to problems, by analysing the suitability and complexity of the proposed algorithms.
- I2 - Know, design and make an efficient use of the data types and data structures that are most suited to solving a problem.



- I10 - e able to design and evaluate human-computer interfaces that ensure accessibility and usability of computer systems, services and applications.
- 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.
- 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.
- MM14 - Be able to create multimedia contents for production environments in broadcasting and digital edition.
- 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.
- MM26 - Be able to conceive, develop and maintain multimedia systems, services and applications using the methods of software engineering as a tool for quality assurance, according to the knowledge acquired as described in the specific competences.
- 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.

## **LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)**

Ability to describe algorithmic solutions to problems.

Designing structured programs using iterative and recursive modules.

Designing data types, objects and classes appropriate to each problem.

Understand advantages and limitations of alternative data structures and be able to select the best option in a particular case.

Using abstraction and recursion to properly design procedures and data structures.

Creating hypermedia content using specific languages.

Designing and adapting presentation styles using markup languages.

Using specific language to create interactive multimedia solutions flexible.



Ability to integrate, synchronize and adapt multimedia content.

## DESCRIPTION OF CONTENTS

### 1. Introduction to multimedia systems

Multimedia concepts.

Integration of web media.

Creating multimedia applications: authoring tools, ,multimedia markup languages.

### 2. Multimedia programming using markup languages

Concepts of CSS.

Creating CSS3 style sheets.

HTML5. Media on the web.

2D Graphics on canvas.

Vector Graphics SVG.

### 3. 3D graphics on the web

Web 3D Graphics Technology

X3D

X3DOM

WebGL: Web Graphics Library

Library Three.js. Features, creating animations.

### 4. Javascript Libraries.

Javascript library for graphics programming on web pages.

Web data visualization.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Laboratory practices	20,00	100
Classroom practices	10,00	100
Attendance at events and external activities	1,00	0
Development of group work	5,00	0
Development of individual work	3,00	0
Study and independent work	15,00	0
Readings supplementary material	2,00	0
Preparation of evaluation activities	16,00	0
Preparing lectures	14,00	0
Preparation of practical classes and problem	24,00	0
Resolution of case studies	10,00	0
<b>TOTAL</b>	<b>150,00</b>	

**TEACHING METHODOLOGY****LECTURES:**

The lectures will be based on active lectures where every 20/25 minutes will be introduced in any activity that requires the involvement of students, so that 1) they can do an activity based on the content they have just learnt, 2) recover the level of attention to the next block.

**LECTURES PREPARATION:**

Students have to prepare the lecture content, following the plan of the course. To do this they will use the literature suggested by the lecturer as well as the materials provided him or/and any other directions provided by the lecturer.

**PREPARATION OF PRACTICAL WORK:**

To better assimilate the contents of the lectures, practical sessions are conducted in the laboratories. Attendance at practical sessions is mandatory and will be verified by the lecturer in charge of the session. Those students that are working and can not attend the practical sessions should contact the lecturer before the beginning of the first session. The results of these activities must be submitted to the lecturer in charge of the group during the course and in the terms established by the lecturer. Students are expected to do/prepare some of these activities at home.





### TEAM WORK:

A set of problems will be proposed that should be solved in teams of 3 to 6 persons. Each member of the group will be graded both the joint mark of the group as the individual mark of each member.

The e-learning platform (Aula Virtual) will be used as communication tool between the lecturer and the student. The student will access to all the material used in the lectures, through Aula Virtual, as well as all the problems and exercise that needs to solve.

## EVALUATION

For the evaluation of the course the following aspects will be considered:

(C) Continuous assessment, based on participation and the degree of involvement on the teaching-learning process. The attendance on regular basis to on-campus lectures/activities will be taken into account. A set of activities consisting of individual and group work to do at home or in class, oral presentations, resolution of issues and problems in class, and some partial individual tests may be conducted during the course. These exercises may be proposed without previous notice.

(E) There will be a final individual test consisting of one or more written exams or test of knowledge. These tests will consist of both theoretical questions and practical problems. It will be necessary to approve each test to compensate.

(P) Assessment of practical activities based on the achievement of objectives in the laboratory sessions and problems and a final work. This section need to be approved to compensate.

The final mark is calculated as follows:

$$\text{Final Mark} = 0.2 * C + 0.5 * E + 0.3 * P$$

In the second summons will be kept note of the continuous assessment (C) and parts (E and P) approved. For unapproved parts (E and P) will be an exam, calculating the final mark as you would at first call.

Only a written exam will be taken into account for the evaluation of the course in second summons. Although the marks got in the first summon could also be considered. The percentages of the fallen parts will be assumed by the exam (up to 75%)

In any case, the evaluation of this subject will be done in compliance with the University Regulations in this regard, approved by the Governing Council on 30th May 2017 (ACGUV 108/2017)



## REFERENCES

### Basic

- HTML 5 and CSS3: Visual QuickStart Guide, Seventh Edition. E. Castro, B. Hyslop. Acceso online a través de la web trobes.uv.es <https://universitatdevalencia.vstbridge.com/#/book-details/9780131382046>
- HTML 5 Canvas: Native Interactivity and Animation for the Web S.Fulton, J. Fulton. O'Reilly media. Accesible online a través de la web trobes.uv.es
- Beginning WebGL for HTML5. B. Danchilla. Apress. Accesible online a través de la web trobes.uv.es
- Three.js Essentials. Jos Dirksen. Packt Publishing. Accesible online a través de la web trobes.uv.es
- HTML5 Media. S. Powers. O'Reilly media. Accesible online a través de la web trobes.uv.es
- Interactive Data Visualization for the Web. Scott Murray. Accesible online a través de la web trobes.uv.es

### Additional

- Learning HTML5 Game Programming: Build Online Games with Canvas, SVG, and WebGL. J. L. Williams. Accesible online a través de la web trobes.uv.es
- Head First jQuery. Benedetti, R. O'Reilly Media, Inc. Accesible online a través de la web trobes.uv.es
- The book of CSS3. P.Gasston. Accesible online a través de la web trobes.uv.es

## ADDENDUM COVID-19

**This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council**

If it is required by the sanitary situation, the Academic Committee of the Degree will approve the Teaching Model of the Degree and its adaption to each subject, establishing the specific conditions in which it will be developed, taking into account the actual enrolment data and the space availability.