VNIVERSITAT Ð VALÈNCIA

COURSE DATA

Data Subject	
Code	34857
Name	Web programming
Cycle	Grade
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)			
Degree	**Center**	**Acad. year**	**Period**
1407 - Degree in Multimedia Engineering	School of Engineering	2	Second term

Subject-matter		
Degree	**Subject-matter**	**Character**
1407 - Degree in Multimedia Engineering	10 - Programación Multimedia	Obligatory

Coordination	
Name	**Department**
PEÑA ORTIZ, RAÚL	240 - Computer Science

SUMMARY

The course "*Hypermedia Programming*" belongs to the second year of the Degree of Multimedia Engineering, which covers part of the compulsory subject *Multimedia Programming*.

This course constitutes a natural evolution of the knowledge and skills acquired in the course "*Human-Computer Interaction*" concerning the development of desktop applications. The course is thus devoted to more complex systems related to distributed environments and the client-server architecture. The basic lines of the course is structured around hypermedia systems and programming of dynamic Web environments and a brief introduction to the SOA architecture.

The aim is to provide a broad overview of the many development solutions for Web applications. Specifically, through this course we will address the programming languages used on both the client side (HTML5, CSS, Javascript) and server side (servlets, JSP, PHP).

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 studied all the previous subjects in the field of computer science.

OUTCOMES

1405 - Grado en Ingenieria Multimedia

- 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.

- 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

This course allows for the following learning outcomes:

1 Ability to describe algorithmic solutions to problems.

2 Designing structured programs using iterative and recursive modules.

3 Designing data types, objects and classes suitable for each problem.

4 Understanding advantages and limitations of alternative data structures and ability to select the best option in a particular case.

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

6 Modelling and distributing hypermedia content using specific languages.

7 Design and adapt presentation styles using markup languages.

Note: The numbering in the list above refer to the numbering of results within the subject *Multimedia Programming*.

To complement the above results, this course also allows to acquire the following skills:

• Use specific languages to create interactive and flexible multimedia solutions.

• Ability to integrate, synchronize and adapt multimedia content.

• Model and solve problems being able to identify the essential elements of a situation and make approximations to reduce problems to a manageable level. This includes solutions that are not derived from the application of a standardized procedure, but providing original, creative and imaginative answers.

• Organize, plan and conduct their own learning, individually and in groups in a coordinated way.

• Working individually and in groups in a coordinated way.

• Work in groups: collaborating, leading, planning, interacting, getting consensus, negotiating, resolving conflicts and respecting the views of others.

• Argue, defend their views and be critical (and self-criticism) from rational and rigorous criteria.

• Preparation and presentation of texts in a clear, coherent, organized and understandable way.

• Oral and written comprehension.

• Add dynamism to HTML pages using client-side languages such as Javascript.

• Know how to apply specific concepts of programming languages such as Java to interact with a Web page in terms of:

- Format and processing of HTML forms requests.
- Persistence of data in the server through session- and application-level variables.
- Elements that enable easy management of persistence, such as cookies and JavaBeans.

• Design and implement a complete Web application that integrates different programming technologies.

DESCRIPTION OF CONTENTS

1. Introduction to hypermedia systems

The context of hypermedia.
Hypermedia systems.
Media: text, audio and image.

2. Fundamentals of Web

Web components: Using the standards URI, HTML, HTTP.
Web Container vs Aplications Container
Web applications. N-tier models.
HTTP protocol.

3. Hypermedia systems development on the client side

HTML5
CSS: Cascading Style Sheets.
Javascript.

4. Web application development on server side (I)

Introduction to distributed programming. Differences regarding the desktop applications (sessions,persistence...)
Models based on programming: CGIs and Servlets.

5. Web application development on the server side (II)

Models based on templates: PHP and JSP..
Model View Controller (MVC). Frameworks.
Brief introduction to the SOA architecture

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Laboratory practices	20,00	100
Classroom practices	10,00	100
Development of group work	12,00	0
Development of individual work	8,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	26,00	0
Preparation of practical classes and problem	29,00	0
TOTAL	150,00	

TEACHING METHODOLOGY

During the on-site basis theoretical activities, the main topics of the course will be shown by providing a global and inclusive vision, analyzing in detail the key and more complex issues, encouraging at all times the students participation. These activities are complemented by practical activities in order to apply the basic concepts and to expand the knowledge and experience that is acquired during the performance of the proposed work. The on-site activities comprise the following:

• Problem-based lectures and questions in the classroom

• Sessions devoted to moderated discussions, and the resolution of problems and exercises that the students have previously worked

• Laboratory-based practical exercises

In addition to on-site activities, students must perform personal tasks (outside the classroom), including: monographs, guided literature research, questions and problems as well as the preparation of classes and exams (study). These tasks will be primarily conducted on an individual basis, thus enabling to enhance self-employment. Additionally, works requiring the participation of small groups of students (2-4) will be proposed to promote the students capacity for integration into working groups.

The University of Valencia e-learning platform (*Aula Virtual*) will be used to support the communication with students. Through this platform the studens will have access to course materials used in class as well as the problems and exercises to solve.

EVALUATION

The knowledge acquired by the student can be evaluated in the following two ways:

• Continuous evaluation system (First call)
• Single evaluation system (Second call)

Mixed evaluation system (First call):

The evaluation of the course will be carried out by:

- Individual objective test (N_Exam), consisting of an exam or knowledge test, which will consist of theoretical-practical questions.
- Continuous assessment (N_Continua), based on participation and degree of involvement in the teaching-learning process, taking into planned face-to-face activities and the resolution of questions, proposed problems and work.
- Evaluation of the practical activities (N_Practices) based on the achievement of objectives in the laboratory sessions and the preparation of work, reports and projects. Individual oral presentations will be held to defend and explain the projects carried out, evaluating the student's ability to transmit knowledge.

Final Score= 15% N_Exam x 20% $\times$ N_Continuous + 65% $\times$ N_Practices

It will be necessary to obtain a minimum grade of 5 in the sections of N_ Exam and N_Practices in order to pass the course.

Attendance at laboratory sessions is mandatory. Those students who do not attend at least 80% of the laboratory sessions will have their practices suspended on first call.

Single Assessment System (Second call)

This method will be applied to any student who has not passed the continuous assessment on the first call.

The evaluation of the course will be carried out by:

- Evaluation of the practical activities (N_Practices) based on the achievement of objectives in the laboratory sessions and the preparation of work, reports and projects. Individual oral presentations will be held to defend and explain the projects carried out, evaluating the student's ability to transmit knowledge.
- Individual objective test (N_Exam), consisting of an exam or knowledge test, which will consist of both theoretical-practical questions and problems.

Final Score = 35% × N_Exam + 65% x N_Practices

It will be necessary to obtain a minimum grade of 5 in the sections N_Practices and N_Exam in order to pass the subject.

In both evaluation systems, the evaluation of the course will be done in accordance with the Regulation of evaluation and qualification of the University of Valencia for the undergraduate and master degrees approved by the Governing Council of May 30, 2017 (ACGUV 108/2017).

REFERENCES

Basic

- David Gourley & Brian Totty. HTTP. The Definitive Guide. ISBN-10: 1-56592-509-2, ISBN-13: 978-1-56592-509-0. Editorial: O´Reilly. 2002
- Collings, Matk J. Pro HTML5 with CSS, Javascript, and Multimedia. ISBN: 1-4842-2462-0, 978-1-4842-2462-5. 2018
- Budi Kurniawan, Servlet & JSP: A Tutorial. ISBN: 1-7719-7027-8, 978-1-7719-7027-3, 2015
- Carr, David, Beginning PHP. ISBN: 1-78953-590-5, 978-1-78953-590-7, 2018.

Additional

- HTML, CSS, Javascript recursos, https://www.w3schools.com/
- Javascript 1.2. http://www.programacion.net/html/tutorial/js/
- Servlets (Básico). http://www.programacion.com/java/tutorial/servlets_basico/
- Servlets y JSP. http://www.programacion.com/java/tutorial/servlets_jsp/
- Introducción a los Servicios Web en Java. http://www.programacion.com/java/tutorial/servic_web/
- HTML5 and JavaScript Projects, Meyer, Jeanine. ISBN: 1-4842-3863-X, 978-1-4842-3863-9, 2018
- Pro HTML5 Games, Shankar, Aditya Ravi, ISBN: 1-4842-2909-6, 978-1-4842-2909-5, 2017