

## Course guide

# 340456 - PMUD-I7P23 - Cross-Platform and Distributed Programming

Last modified: 17/05/2023

**Unit in charge:** Vilanova i la Geltrú School of Engineering  
**Teaching unit:** 723 - CS - Department of Computer Science.

**Degree:** BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).  
BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2018). (Optional subject).

**Academic year:** 2023    **ECTS Credits:** 6.0    **Languages:** Catalan, English

### LECTURER

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**Coordinating lecturer:** Esteve Cusine, Jordi

**Others:** Esteve Cusine, Jordi

### PRIOR SKILLS

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Basic knowledge of programming (variables, functions, alternative instructions with if, repetitive instructions with while or for).

### REQUIREMENTS

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Have been passed the FOPR course (computer students) or INFO course (students from other degrees).  
Have a laptop.

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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#### Specific:

I\_CEFC11. CEFC11. Knowledge and application characteristics, functions and structure of Distributed Systems, Computer Networks and the Internet and design and implement applications based on them.

I\_CEFC17. CEFC17. Ability to design and evaluate computer interfaces that guarantee accessibility and usability of informatic systems, services and applications.

I\_CEIS3. CEIS3. Ability to solve problems of integration in terms of strategies, standards and available technologies.

I\_CETI3. CETI3. Ability to set up methodologies focused on user and development organization, valuation and application management and systems based on information technologies which secure ergonomic accessibility and use of

I\_CETI6. CETI6. Ability to design systems, applications and services based on network technologies, including internet, website, e-commerce, multimedia, interactive services and mobile computing.

#### Transversal:

04 COE N2. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.

04 COE N3. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

06 URI. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

07 AAT. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.

## TEACHING METHODOLOGY

Presentation in the classroom, in participatory lessons, of concepts associated with the subjects.  
Performing individually practices in attendance and non-attendance way.

Mainly workshop, always developed in front of the student's computer laptop. The student is responsible for his own learning.

## LEARNING OBJECTIVES OF THE SUBJECT

1. Learn the basic principles of Internet (IP, URL, protocols, client/server).
2. Understanding the implications behind the fact of developing a cross-platform application.
3. Learning to program web multiplatform and responsive applications with HTML5, CSS3 and Java-Script using libraries.
4. Understanding how distributed applications work on internet, what are Web Services, and knowing in detail the REST services and the RESTful APIs.
5. Learning how to program web servers that offer a web application or a RESTful APIs.
6. Learning how to program web clients that interact with a RESTful API.
7. Obtain the resources to be up to date in this quickly changing world.

## STUDY LOAD

Type	Hours	Percentage
Hours small group	30,0	20.00
Hours large group	30,0	20.00
Self study	90,0	60.00

**Total learning time:** 150 h

## CONTENTS

### Introduction to the Internet and multiplatform programming

#### Description:

Theoretical concepts of Internet (URL, protocols, client/server) and multiplatform programming based on Internet standards (HTML5, CSS3, Java-Script).

#### Full-or-part-time: 4h

Theory classes: 2h

Self study : 2h

### Practice 1. HTML5

#### Description:

Development of basic web pages with HTML5. Discovering the new features offered by HTML5.

#### Full-or-part-time: 10h

Laboratory classes: 6h

Self study : 4h

### Practice 2: CSS3

**Description:**

Giving style to web pages with CSS3. Discovering the new features offered by CSS3.

**Full-or-part-time:** 4h

Laboratory classes: 2h

Self study : 2h

### Practice 3: Java-Script

**Description:**

Discovery of Java-Script programming language and its features. How Java-Script can modify the DOM (Document Object Model) of an HTML document. Practice for developing an interactive static website programmed in Java-Script.

**Full-or-part-time:** 16h

Laboratory classes: 8h

Self study : 8h

### Practice 4: jQuery library

**Description:**

Features and advantages of jQuery library. Development of a small project with HTML5, CSS3 and Java-Script using jQuery.

**Full-or-part-time:** 8h

Laboratory classes: 4h

Self study : 4h

### Practice 5: Bootstrap library

**Description:**

Development of a small project about an adaptive and responsive website with Bootstrap.

**Full-or-part-time:** 8h

Laboratory classes: 4h

Self study : 4h

### Distributed Programming

**Description:**

Theoretical aspects of Distributed Programming: Types of software architectures, how distributed applications work on the Internet, Web Services (in particular REST services and RESTful APIs).

**Full-or-part-time:** 4h

Theory classes: 2h

Self study : 2h



#### Practice 6. Servidor web with NodeJS

**Description:**

Programming web servers with NodeJS. Package management with npm (Node Packet Manager).

**Full-or-part-time:** 4h

Laboratory classes: 2h

Self study : 2h

#### Practice 7. Framework Express for NodeJS

**Description:**

Web servers programming with an MVC architecture (Model-View-Controller) using the Express framework for NodeJS. Concepts of templates, routes and middlewares.

**Full-or-part-time:** 16h

Laboratory classes: 8h

Self study : 8h

#### Practice 8. Web server with RESTful API

**Description:**

Programming of web servers that offer a RESTful API with NodeJS and Express.

**Full-or-part-time:** 8h

Laboratory classes: 4h

Self study : 4h

#### Practice 9. Web client connected to a RESTful API

**Description:**

Programming a web client with that connects to the RESTful API made in the previous practice.

**Full-or-part-time:** 8h

Laboratory classes: 4h

Self study : 4h

#### Final project

**Description:**

Develop a web service with a RESTful API that allows you to manage a specific need. Develop a web application that uses this service.

**Full-or-part-time:** 30h

Self study : 30h



### Research work

**Description:**

Research work around multiplatform and distributed programming (for example on some client or server web technology we have not seen in class). There will be a public presentation in class (20-30 min. exposure + 10 min. questions).

**Full-or-part-time:** 30h

Theory classes: 6h

Self study : 24h

### GRADING SYSTEM

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60% Work done in classroom and evaluation of the applications submitted (30% work during the course, 30% final work).

30% Preparation and public presentation of a technical work analyzing the state of the art of some specific technology.

10% Participation and motivation (if any additional activity is necessary for this last 10%, it may be in the form of a control or mini-test).

Because 100% of the subject is evaluated with practical work, there is not a final control or a review control in the form of a written test.