

## 804226 - PROG1VJ - Programming I

Coordinating unit:	804 - CITM - Image Processing and Multimedia Technology Centre
Teaching unit:	804 - CITM - Image Processing and Multimedia Technology Centre
Academic year:	2019
Degree:	BACHELOR'S DEGREE IN VIDEO GAME DESIGN AND DEVELOPMENT (Syllabus 2014). (Teaching unit Compulsory) BACHELOR'S DEGREE IN VIDEO GAME DESIGN AND DEVELOPMENT (Syllabus 2014). (Teaching unit Compulsory)
ECTS credits:	6
Teaching languages:	Catalan, Spanish

### Teaching staff

Coordinator: Zúñiga Zárate, Ana Gabriela

Others: Sánchez Carreras, David

### Degree competences to which the subject contributes

Specific:

3. (ENG) Utilizar lenguajes de programación, patrones algorítmicos, estructuras de datos, herramientas visuales de programación, motores de juego y librerías para el desarrollo y prototipado de videojuegos, de cualquier género y para cualquier plataforma y dispositivo móvil.

Generical:

1. (ENG) Interpretar los fundamentos del uso y programación de los computadores, los sistemas operativos, las bases de datos y, en general, los programas informáticos con aplicación en ingeniería.

2. (ENG) Interpretar i dominar els conceptes bàsics de matemàtica discreta, lògica, algorísmica i complexitat computacional, i la seva aplicació per al tractament automàtic de la informació per mitjà de sistemes computacionals i la seva aplicació per a la resolució de problemes propis de l'enginyeria.

Transversal:

4. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.

5. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

### Teaching methodology

Lectures are divided in 2h sessions. During lectures, the teacher presents the theoretical concepts and explains them by means of examples that are solved in class. Some time is also dedicated to the resolution of exercises by the students with the assistance of the teacher (solve the doubts that may appear). An extensive use of campus virtual is mandatory, since the material of the course (slides, exercises, exams, etc.) and the communication between the students and the teacher are done through this system.

Tasks of the course: There are three types of tasks that are planned during the course:

- Four practical exercises to evaluate specific topics of the course (PE).
- A midterm exam that is done in the midterms week 7, specified in the academic calendar (ME).
- The final exam (FE).

### Learning objectives of the subject

Specific:

-Ability to understand and master the basic concepts of logic, algorithms and computational complexity, and its

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application for solving problems of engineering.

- Knowledge of the basics of using and coding software with applications in engineering.
- Using programming languages, patterns and data structures.

Transversal:

- EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
- EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

### Study load

Total learning time: 150h	Hours large group:	24h	16.00%
	Hours medium group:	16h	10.67%
	Hours small group:	0h	0.00%
	Guided activities:	20h	13.33%
	Self study:	90h	60.00%

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### Content

<p>1.Basic concepts</p>	<p>Learning time: 11h Theory classes: 4h 30m Self study : 6h 30m</p>
<p>Description:</p> <ul style="list-style-type: none"> <li>1.1. Definitions: Algorithm and Program.</li> <li>1.2. Programming languages. Classification. C language.</li> <li>1.3. Compile and link.</li> <li>1.4. Execution.</li> <li>1.5. C compiler. Features.</li> <li>1.6. Examples of games programmed in C.</li> <li>1.7. Introduction to Visual Studio</li> </ul> <p>Related activities: Combine theoretical and practical activities.</p>	
<p>2.Types, operators and expressions</p>	<p>Learning time: 10h Theory classes: 4h Self study : 6h</p>
<p>Description:</p> <ul style="list-style-type: none"> <li>2.1. Variable Names</li> <li>2.2. Data types and sizes</li> <li>2.3. Constants</li> <li>2.4. Declarations</li> <li>2.5. Arithmetic operators</li> <li>2.6. Relation and logical operators</li> <li>2.7. Casting types</li> <li>2.8. Increment and decrement operators</li> <li>2.9. Assigment operators and expressions</li> </ul> <p>Related activities: Combine theoretical and practical activities.</p>	

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<p>3.Control flow</p>	<p>Learning time: 25h Theory classes: 10h Self study : 15h</p>
<p>Description: 3.1 Statements and blocks 3.2 If-else 3.3 Else-if 3.4 Switch 3.5 Loops-while and for 3.6 Loops-do-while 3.7 Break and continue</p> <p>Related activities: Combine theoretical and practical activities.</p>	
<p>Functions and program structure</p>	<p>Learning time: 30h Theory classes: 12h Self study : 18h</p>
<p>Description: 4.1. Basics of Functions 4.2. Functions returning non-integers 4.3. External variables 4.4. Scope rules 4.5. Header files 4.6. Static variables 4.7. Register variables 4.8. Block structure 4.9. Initialization 4.10. The C preprocessor 4.11. Standard libraries</p> <p>Related activities: Combine theoretical and practical activities.</p>	
<p>Midterm exam 1</p>	<p>Learning time: 2h Theory classes: 2h</p>
<p>Description: Examen Parcial 1</p>	

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<p>5.Arrays</p>	<p>Learning time: 30h Theory classes: 12h Self study : 18h</p>
<p>Description: 5.1 One-dimensional arrays 5.2 Multidimensional arrays 5.3 Traversals and searches in arrays</p> <p>Related activities: Combine theoretical and practical activities.</p>	
<p>6.Structures</p>	<p>Learning time: 25h Theory classes: 10h Self study : 15h</p>
<p>Description: 6.1. Basic structures 6.2. Structures and functions 6.3. Arrays of structures 6.4 Typedef 6.5 Unions</p> <p>Related activities: Combine theoretical and practical activities.</p>	
<p>7.Files</p>	<p>Learning time: 15h Theory classes: 6h Self study : 9h</p>
<p>Description: 7.1. Introduction 7.2. Read files 7.3. Write files</p> <p>Related activities: Combine theoretical and practical activities.</p>	



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Final exam	Learning time: 2h Theory classes: 2h
Description: Examen teóric y práctico	

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### Planning of activities

name english	Hours: 6h Theory classes: 2h Self study: 4h
Support materials: S01_Practica.pdf	
name english	Hours: 12h Theory classes: 4h Practical classes: 8h
name english	Hours: 7h Theory classes: 2h Practical classes: 5h
name english	Hours: 30h Theory classes: 12h Practical classes: 18h
name english	Hours: 30h Theory classes: 12h Practical classes: 18h
name english	Hours: 25h Theory classes: 10h Practical classes: 15h
name english	Hours: 15h Theory classes: 6h Practical classes: 9h

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### Qualification system

The mark of the subject (M) is computed as follows:

$$M = 0.2 * ME + 0.4 * PE + 0.3 * FE + 0.1 * PLA$$

where ME is the mark of the midterm exam, PE are the 3 practical exercises that will be done throughout the course (note that the mark each one corresponds to the 10% of the final mark of the subject) , FE is the mark of the final exam and PLA is Participation and learning attitude.

Students who do not pass the subject through continuous assessment will have the possibility of presenting themselves to the re-assessment test. In this test all the qualifications will be reevaluated, except 10% of attitude and learning, and the resulting final grade of subject can not exceed 5.

### Regulations for carrying out activities

Different exercises will be proposed at each class and the students have to solve before the next class individually. The solution must be upload to the Virtual Campus before the deadline.

### Bibliography

Basic:

Kernighan, B.W.; Ritchie, D.M. El lenguaje de programación C. 2ª ed. México: Prentice Hall, 1991. ISBN 9688802050.

Complementary:

Joyanes Aguilar, L. Fundamentos de programación: algoritmos y estructura de datos. 2ª ed. Madrid [etc.]: McGraw-Hill, 1996. ISBN 8448106032.

Joyanes , L.; Zahonero, I. Algoritmos y estructuras de datos: una perspectiva en c. Madrid: McGraw-Hill, 2004. ISBN 9788448140779.

Others resources:

Hyperlink

C reference

<http://en.cppreference.com/w/c>