Course guide
804226 - PROG1VJ - Programming I

Last modified: 18/05/2026

Unit in charge: Image Processing and Multimedia Technology Centre
Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre.

Degree: BACHELOR'S DEGREE IN VIDEO GAME DESIGN AND DEVELOPMENT (Syllabus 2014). (Compulsory subject).

Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan, English

LECTURER

Coordinating lecturer: Díaz Iriberri, Jose

Others: Martín Mínguez, Mónica

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 (Atenea) 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:
- Two practical tests/exercises to evaluate specific topics of the course (P).
- A midterm exam that is done in the midterms week 7, specified in the academic calendar (EP).
- The final exam (EF).

LEARNING OBJECTIVES OF THE SUBJECT

- To distinguish the concepts related to programming in the field of video game design and development: algorithm, type, value, variable, recursion, interpretation and compilation.

- To develop programs capable of: performing line-by-line input/output actions on text files, using control, repetition and selection structures, handling strings, vectors, registers and arrays, and using data streams.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	16,0	10.67
Self study	90,0	60.00
Hours large group	24,0	16.00
Guided activities	20,0	13.33

Total learning time: 150 h

CONTENTS

1.Basic concepts and algorithms

Description:
1.1. Definitions: Algorithm and Program.
1.2. Programming languages. Classification. C language.
1.3. Compiling and linking.
1.4. Execution.
1.5. C compiler. Features.
1.6. Examples of games programmed in C.
1.7. Introduction to Visual Studio.

Related activities:
Combine theoretical and practical activities.

Full-or-part-time: 11h
Theory classes: 4h 30m
Self study : 6h 30m

2.Types, operators and expressions

Description:
2.1. Variable Names.
2.2. Data types and sizes.
2.3. Constants.
2.4. Declarations.
2.5. Arithmetic operators.
2.6. Relation and logical operators.
2.7. Casting types.
2.8. Increment and decrement operators.
2.9. Assigment operators and expressions.

Related activities:
Combine theoretical and practical activities.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

3.Control flow

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.

Related activities:
Combine theoretical and practical activities.

Full-or-part-time: 25h
Theory classes: 10h
Self study : 15h

4.Functions and program structure

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.

Related activities:
Combine theoretical and practical activities.

Full-or-part-time: 30h
Theory classes: 12h
Self study : 18h

Midterm exam

Description:
Midterm Exam

Full-or-part-time: 2h
Theory classes: 2h

5.Arrays

Description:
5.1 One-dimensional arrays.
5.2 Multidimensional arrays.
5.3 Traversals and searches.

Related activities:
Combine theoretical and practical activities.

Full-or-part-time: 30h
Theory classes: 12h
Self study : 18h

6.Structures

Description:
6.1. Basic structures.
6.2. Structures and functions.
6.3. Arrays of structures.
6.4 Typedef.
6.5 Unions.

Related activities:
Combine theoretical and practical activities.

Full-or-part-time: 25h
Theory classes: 10h
Self study : 15h

7.Files

Description:
7.1. Introduction.
7.2. Read files.
7.3. Write files.

Related activities:
Combine theoretical and practical activities.

Full-or-part-time: 15h
Theory classes: 6h
Self study : 9h

Final exam

Description:
Examen teórico y práctico

Full-or-part-time: 2h
Theory classes: 2h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

The mark of the subject (NF) is computed as follows:
NF = 0.2 * EP + 0.4 * P + 0.3 * EF + 0.1*PAA

where EP is the mark of the midterm exam, P are the two tests of practical exercises that will be done throughout the course (note that the mark each one corresponds to the 20% of the final mark of the subject), EF is the mark of the final exam and PAA 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 the qualifications of the exams (EP and EF) will be reevaluated. The resulting final grade of subject can not exceed 5.

Irregular actions that may lead to a significant variation of the grade of one or more students constitute a fraudulent performance of an evaluation act. This action entails the descriptive grade of failure and a numerical grade of 0 for the ordinary global evaluation of the course, without the right to re-evaluation.

If the lecturers have indications of the use of AI tools not allowed in the evaluation tests, they may summon the students concerned to an oral test or a meeting to verify the authorship.

EXAMINATION RULES.

The scoring tests and exams will be carried out in person in the classroom on the day and time stipulated individually. All tests will have a maximum duration of 2 hours. To correctly perform the exercises, the instructions specified in the work document must be strictly followed.

Deliveries will not be accepted outside the hours established on the day and time of the test.

The files submitted for evaluation must be able to be opened and executed on any university computer. Those tests that cannot be executed correctly will automatically result in a failure.

The documents must be completed, following the instructions, especially regarding file names. The correct management of the documentation provided is an aspect of the skills to be acquired and part of the evaluation.

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 [on line]. 5ª ed. Madrid [etc.]: McGraw-Hill, 2020 [Consultation: 06/05/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=10211. ISBN 9781456279448.
- Joyanes , L.; Zahonero, I. Algoritmos y estructuras de datos: una perspectiva en c. Madrid: McGraw-Hill, 2004. ISBN 9788448140779.

RESOURCES

Hyperlink:
- Documentació llenguatge C. https://www.cplusplus.com/reference/