Course guide
804228 - ASO - Computer Architecture and Operating Systems

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: Costa Prats, Juan José

Others: Costa Prats, Juan José
García Almiñana, Jordi

PRIOR SKILLS

TEACHING METHODOLOGY

The course will combine presentations of fundamental concepts by the teacher with participatory sessions, where students will prepare, present and defend works on specific concepts of the subject. Collaborative learning techniques are used to motivate students to carry out the activities. Additionally, practical work will be encouraged where the concepts studied are put into practice. Therefore, the teaching methodologies will be used:
. Expository method / master lesson.
. Participatory class.
. Learning based on problems and exposures and defenses of practices or works.
. Practical programming sessions.

LEARNING OBJECTIVES OF THE SUBJECT

- To identify the programming languages, libraries, operating systems, databases and computer programs that apply to the design and development of video games.

- To use programming languages and libraries in the implementation of databases and computer programs for applications in the design and development of video games.

- To apply, in the field of video game development and network games, the management of: processes, memory, file system, input/output and communication protocols.

STUDY LOAD

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

Total learning time: 150 h

CONTENTS

Theme 1: Introduction. Evolution of computers and operating systems

Description:
Introduction to the course

Full-or-part-time: 5h
Theory classes: 2h
Self study : 3h

Part I: Computer's architecture

Description:
· Theme 2: Computer's architecture
· Theme 3: The assembly language
· Theme 4: Current computers

Full-or-part-time: 85h
Theory classes: 34h
Self study : 51h

Part II: Operating systems

Description:
· Topic 5: Basic structure of the operating system
· Topic 6: Memory management
· Topic 7: Process management
· Topic 8: Input / output management
· Topic 9: Specific aspects of the OS for video games

Full-or-part-time: 60h
Theory classes: 24h
Self study : 36h

ACTIVITIES

Hands On Lab (HOL)

Description:
Practical part of the course where the theoretical concepts explained are put into practice: assembler, process management, report and input / output.

Full-or-part-time: 15h
Laboratory classes: 15h

Research Work

Description:
Research work to apply the theoretical concepts of the course to a specific use case in the world of video games

Full-or-part-time: 8h
Theory classes: 8h

Test

Description:
Exam to demonstrate the achievement of theoretical concepts

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 course is evaluated by the evaluation of these components:
Exam part1 (EX1)
. Research work (TR)
. Exam part2 (EX2)
. Practical work (TP)
Both exams are carried out in the middle and end of the course respectively and are of a theoretical nature, where the student must demonstrate knowledge and understanding of the concepts worked during the course.
The research work consists of the search for documentation during the course on specific concepts of the subject, and includes a presentation and debate. The practical work consists of solving a series of programming problems that show the concepts studied. These works will be carried out in groups. The final grade is calculated according to the relationship:

F = 22.5% EX1 + 22.5% TR + 22.5% EX2 + 22.5% TP + 10% AA

Where AA corresponds to participation and attitude of learning.

Students who fail in the continuous assessment can be re-evaluated (as long as the grade is different from NP). The grade obtained in the reevaluation replaces, if higher, the set of those obtained in the midterm and final exams. The final grade for the course, calculated from the reevaluation exam, 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.

BIBLIOGRAPHY

Basic:
- Randal E. Bryant, David R. O'Hallaron. Computer Systems: A programmer's perspective. Pearson Education,
- Kip R. Irvine. Lenguaje ensamblador para computadoras basadas en Intel®. Pearson Educación , 2008.