

Course guide

804460 - PROG II - Programming II

Last modified: 17/07/2024

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

Degree: BACHELOR'S DEGREE IN DIGITAL DESIGN AND MULTIMEDIA TECHNOLOGIES (Syllabus 2023).
(Compulsory subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Caldas Pires, Bruno

Others:

TEACHING METHODOLOGY

The directed learning classes are structured in two-hour sessions. During part of the sessions, the teacher theoretical concepts and exemplifies them by means of examples which are solved, as far as possible, in a participatory way, by the students. Another part of the session is devoted to students practising the concepts introduced by solving a series of exercises. The students practice the concepts introduced by solving a series of exercises proposed by the teacher and, where appropriate, time is also devoted to solving doubts and problems. Time will also be devoted to the resolution of doubts and problems encountered during the exercises. Intensive use will be made of the virtual campus, both to publish the course material (notes, problem statements, proposed solutions, compilation The virtual campus will be used intensively, both to publish course material (notes, problem statements, proposed solutions, collection of links, etc.) and as a communication mechanism to publish notices, requesting revisions of the different tests, etc.

Planning of activities

We distinguish three types of activities:

- Evaluation test on specific topics of the subject that students will solve during class time. (ET).
- A partial exam during the week scheduled in the academic calendar (EP).
- The final exam of the subject (EF).

LEARNING OBJECTIVES OF THE SUBJECT

Knowledge or contents

Recognise the concept of recursion in computer programming and be able to propose recursive solutions to simple problems.

Abilities or skills

Identify the process of building a computer program and use the tools required.

Apply the object-based design model in computer programming.

From a specification, model and implement simple objects with classes in computer programming.

Use existing libraries in the development of programs and implement libraries that allow the reuse of code in simple programming problems.

Ability to adapt to any programming language.



STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours medium group	18,0	12.00
Guided activities	12,0	8.00
Hours large group	30,0	20.00

Total learning time: 150 h

CONTENTS

Tema 1: Github

Description:

- 1.1 Repositories
- 1.2 Version control
- 1.3 Github desktop
- 1.4 Commands: clone, add, commit, push, pull

Full-or-part-time: 12h

Theory classes: 4h

Self study : 8h

Topic 2: Introduction to C++

Description:

- 2.1 C++ language
- 2.2 C++ Library
- 2.3 From C to C++

Full-or-part-time: 12h

Theory classes: 4h

Self study : 8h

Topic 3: Pointers and References

Description:

- 3.1 Basic Concepts
- 3.2 References - Address operator &
- 3.3 Pointers - Operator *
- 3.4 Passing parameters by reference
- 3.5 Pointers and Arrays
- 2.6 Pointers and Structs

Full-or-part-time: 24h

Theory classes: 8h

Self study : 16h



Topic 4: Data Structures

Description:

- 4.1 Strings
- 4.2 Stacks and queues
- 4.3 Lists
- 4.4 Dynamic vectors
- 5.5 Trees

Full-or-part-time: 24h

Theory classes: 8h

Self study : 16h

Topic 5: Object Orientation

Description:

- 5.1 How to think about Objects
- 5.2 Design of an Object Class
- 5.3 Constructors
- 5.4 Inheritance
- 4.5 Operator overload
- 4.6 Polymorphism

Full-or-part-time: 24h

Theory classes: 8h

Self study : 16h

Topic 6: Recursion

Description:

- 6.1 Basic Concepts
- 6.2 Characteristics of Recursion
- 6.3 Types of Recursion
- 6.4 Advantages and Disadvantages of Recursion

Full-or-part-time: 12h

Theory classes: 4h

Self study : 8h

Tema 7: Multimedia applications with C++

Description:

- 7.1 Introduction to OpenFrameworks
- 7.2 Bàsic Structure
- 7.3 Multimedia resources
- 7.4 Extensions

Full-or-part-time: 28h

Theory classes: 8h

Self study : 20h



Midterm Exam

Description:

Midterm exam held during week 7, as foreseen in the academic calendar.

Full-or-part-time: 2h

Practical classes: 2h

Final Exam

Description:

Final Exam

Full-or-part-time: 2h

Practical classes: 2h

Projecte Final

Description:

Multimedia project

Full-or-part-time: 10h

Self study : 10h

ACTIVITIES

C++ Assignment

Description:

Practice in adapting the contents already assimilated to the new C++ language.

Material:

The statement will be provided in Atenea

Delivery:

Atenea

Full-or-part-time: 2h

Practical classes: 2h

Advanced C++ Practice

Description:

Advanced C++ Practice

Material:

Statement provided

Delivery:

Atenea

Full-or-part-time: 6h

Self study: 6h

Final Object Oriented Practice

Description:

Practice encompassing all OOP content

Material:

Provided Statement

Delivery:

Atenea

Full-or-part-time: 6h

Self study: 6h

Structures and Algorithms Practice

Description:

Structures and Algorithms Practice

Material:

Statement provided

Delivery:

Atenea

Full-or-part-time: 6h

Self study: 6h

GRADING SYSTEM

The subject grade (NF) will be calculated using the following formula:

$$NF = 0.15 * EP + 0.25 * EE + 0.3 * EF + 0.2 * PF + 0.1 * PAA$$

Being EP the grade of the partial exam, EE the grades of the scoring exercises to be carried out during the course, EF the grade of the final exam, PF the grade of the final project and PAA the participation and learning attitude.

Students who do not pass the subject through continuous assessment will have the possibility of taking the re-evaluation test. In this test, only exam grades will be re-evaluated and the resulting final subject grade may not exceed 5.

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

If the teachers have evidence of the use of AI tools that are not permitted in the assessment tests, they may summon the students involved to an oral test or a meeting to verify the authorship.

EXAMINATION RULES.

In each class there will be exercises that the student must complete at the required time. The documentation for each session will specify the guidelines to follow for the correct presentation of the content of each exercise.

To do so, the instructions specified in the working document must be followed.

Once completed, the controls will be deposited in the Virtual Campus upon delivery to the section classroom on the corresponding date. Only those exercises delivered before the deadline will be taken into account to evaluate them.

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.

In order to pass the controls, students will have to dedicate time for autonomous work (out of hours) to perform exercises.



BIBLIOGRAPHY

Basic:

- Ceballos Sierra, Francisco Javier. C/C++ : curso de programación . 5a edición. Paracuellos de Jarama, Madrid : Ra-Ma, 2019. ISBN 978-84-9964-812-5.
- Franch Gutiérrez, Xavier. Fonaments de programació [Recurs electrònic] : problemes resolts en C++ . Barcelona : Edicions UPC, 2006. ISBN 9788498801309.

RESOURCES

Other resources:

<https://cplusplus.com/> /><https://www.cprogramming.com/> /><https://jutge.org/> /><https://www.openframeworks.cc/>