VNIVERSITAT Ģ DVALÈNCIA

COURSE DATA

Data Subject

Code	34852
Name	Programming
Cycle	Grade
ECTS Credits	6.0
Academic year	2020 - 2021

Study (s)

Degree	Center	Acad. year	Period
1407 - Degree in Multimedia Engineering	School of Engineering	1	Second term

Subject-matter

Degree	Subject-matter	Character
1407 - Degree in Multimedia Engineering	3 - Informática	Basic Training

Coordination

Name	Department
GARCIA CALDERARO, JOSE FRANCISCO	240 - Computer Science

SUMMARY

The course "Programming" is a subject of the first year of the Degree of Multimedia Engineering, which covers part of the basic matter Informatics.

This course explores the knowledge and skills in C + + programming seen on the subject "Informatics", which can be considered to be a continuation. The basic lines of the course is organized around Object Oriented Programming and Abstract Data Types and their various interrelationships. Also there will be studied by certain detail the analysis of the temporary cost of the algorithms, which allow students to decide the most appropriate algorithm for each particular problem.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

It is highly desirable that students have taken the course "Informatics" to know how to:
- Analyze simple problems and design algorithms to be solved using the computer.
- Data types, variables, constants, control structures and basic data structures within the procedural programming languages context.
- Use the procedural programming paradigm to solve problems using a computer. To be able to codify simple algorithms in a structured programming language.

OUTCOMES

1405 - Grado en Ingenieria Multimedia

- G6 - Know the basic subject areas and technologies that serve as a basis to learn and develop new methods and technologies and those that provide versatility to adapt to new situations.

- B3 - Be able to understand and master the basics of discrete mathematics, logic, algorithmic and computational complexity, and their application to solve engineering problems.

- B4 - Have basic skills in the use and programming of computers, operating systems, databases and computer software for use in engineering.

- B5- Know the structure, organisation, operation and interconnection of computer systems, the fundamentals of their programming and their application to solve engineering problems.

- I1- Know and be able to apply basic computer algorithmic procedures to design solutions to problems, by analysing the suitability and complexity of the proposed algorithms.

- I3 - Be able to analyse, design, build and maintain applications in a robust, secure and efficient manner by choosing the most suitable paradigm and programming languages.

- I8 - Know and apply the tools needed for the storage of, processing of and access to information systems, including web-based systems.

- MM21 - Communicate effectively, both in writing and verbally, knowledge, procedures, results and ideas related to ICT and specifically to multimedia, and know their socioeconomic impact.

- MM22 - Have knowledge and ability to understand essential facts, concepts, principles and theories related to multimedia and to the spectrum of reference disciplines.

- MM25 - Be able to define, evaluate and select hardware and software platforms for the development and implementation of multimedia systems, services and applications, according to the knowledge acquired as described in the specific competences.

- MM28 - Be able to solve problems with initiative, decision-making and creativity and to communicate and transmit the knowledge, abilities and skills of a multimedia engineer.

LEARNING OUTCOMES

At the end of the course, students will be able to:

- Calculate the theoretical time cost of an algorithm. Express the cost using asymptotic notation.

- Use classes, inheritance, and operator overloading to implement programs.

- Decide the abstract data type most appropriate for a particular problem, distinguishing between vectors, stacks, queues and lists.

- Use the most appropriate implementation for a particular ADT, including static and dynamic implementations.

- Propose solutions to programming problems using object-oriented programming with C ++.

DESCRIPTION OF CONTENTS

1. Introduction to the study of algorithms and complexity

- Definition of complexity and its measure
- Information Retrieval: Search
- Sorting methods

2. Abstract data types

- Data types
- Data structures
- Abstract data types

3. Object-oriented programming

- Classes
- Overloading
- Inheritance
- Introduction to templates. Standard Template Library (STL).

4. Stacks

- Definition of the abstract data type Stack.
- Static representation.
- Dynamic representation. Pointer data type.
- STL and stacks.
- Applications.

5. Queues

- Definition of the abstract type Queue
- Static and dynamic representation
- STL and Queues
- Applications

6. Lists

- Definition of list with point of interest
- Static and dynamic representation
- Improvements in the representation of linked lists
- Iterators
- STL and lists
- Applications

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Laboratory practices	20,00	100
Classroom practices	10,00	100
Development of group work	14,00	0
Development of individual work	15,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	26,00	0
Preparation of practical classes and problem	20,00	0
TOTAL	150,00	

TEACHING METHODOLOGY

During the theoretical activities we will provide a global and inclusive vision of the subject, analyzing in detail the key and more complex issues. We will encourage the students to discuss them in the classroom. This work is complemented with practical activities:

- Problems and exercises which are solved in the classroom
- Discussion sessions of problem previously solved at home.
- Activities in the laboratory.
- Individual questionnaires of exercises in the classroom with the presence of teachers.

In addition to the classroom activities, students must perform individual tasks (outside the classroom) about: monographs, literature search and problem-solving and preparation of exams. These tasks also include working in small groups of students (2-4).

The platform of e-learning (virtual classroom) of the University of Valencia will be used to support the interaction and communication with students. The course materials will be also available.

EVALUATION

The following aspects will be taken into consideration for the evaluation of the course:

SE1 - Objective evaluation, consisting of one or more examinations consisting of both theoretical and practical questions and problems.

SE2 - Evaluation of practical activities based on the preparation of papers/memorials and/or oral presentations.

SE3 - Ongoing assessment of each student, based on the student's participation and degree of involvement in the teaching-learning process, taking into account regular attendance at planned classroom activities and the resolution of periodically proposed questions and problems.

En cada una de estas pruebas se tendrán en cuenta las siguientes consideraciones:

1) SE1: A number of individual tests will be conducted throughout the course, consisting of both theoretical and practical issues and problems. There will be two types of tests with the following weight:

- SE1a (80%): Examination of the subject at the end of the course.
- SE1b (20%): Intermediate controls carried out during the teaching period.

2)   SE2: Evaluation of the practical activities carried out both in the laboratories and in written exercises. These tests will be carried out in groups of 2 people and include the following activities:

- SE2a (80%): Evaluation of laboratory practices from the documentation (and with the deadlines) required in each of them.
- SE2b (20%): Performance of written practical exercises in intermediate controls carried out during the teaching period.

3)   SE3: Continuous evaluation of each student to measure their degree of participation and involvement in classroom activities. The following aspects will be considered: Resolution of periodically proposed exercises; Public resolution of issues and problems discussed in class; Resolution of questionnaires; Active participation in class.

The final qualification of the course will be calculated as the weighted average of the 3 previous sections, according to the following relative weights of each one of them: SE1 (55%), SE2 (35%), SE2 (10%).

Particular considerations of the evaluation:

1)   Non-recoverable sections: The following criteria evaluate the monitoring of the subject during the academic period and are not recoverable afterwards: SE1b, SE2b and SE3. Section SE2a will be recoverable, only in the 2nd call, by means of a practical exam carried out in a laboratory in conditions equivalent to those of a laboratory practice, but with a limitation of time and access to support materials.

2)   Sections requiring a minimum score: A minimum score of 4 (out of 10) is required in each of the following evaluation sections in order to pass the course: SE1a and SE2a.

In any case, the evaluation of the course will be done in accordance with the University of Valencia's Evaluation and Qualification Regulations for Bachelor's and Master's Degrees approved by the Governing Council on 30 May 2017 (ACGUV 108/2017).

REFERENCES

Basic

- Referencia b1:   TADs Estructuras de datos y resolución de problemas con C++ (2ª Ed.)
  L.R. Nyhoff. Prentice Hall, 2005
  Referencia b2:   Resolución de problemas con C++ (5ª Ed.)
  W. Savitch. Prentice Hall, 2007
  Referencia b3:   Cómo programar en C++ (6ª Ed.)
  H.M. Deitel, P.J. Deitel, P.J. . Prentice Hall, 2009

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Additional

- - C++ plus data structures
  N. Dale, C. Weems, T. Richards. Burlington, MA: Jones & Bartlett Learning, 2016
  http://proquest.safaribooksonline.com/?uiCode=valencia&xmlId=9781284089196

- - C++ How to Program, Ninth Edition
  H.M. Deitel, P.J. Deitel, P.J. Prentice Hall, 2013
  http://proquest.safaribooksonline.com/book/programming/cplusplus/9780133378795/firstchapter

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

The teaching methodology for this subject will follow the model approved by the Academic Committee of the GII / GIM degrees (https://links.uv.es/catinfmult/modeloDocent). If the facilities are closed because of COVID-19 pandemics, the scheduled lectures will be replaced by synchronous online sessions within the assigned time slots of the course, using the tools provided by the university.

If the facilities need to be closed due to the pandemics causing any of the evaluation exercises to be held at ETSE-UV, these exercises will be substituted by equivalent exercieses held online using the tools provided by the university. The weights for each activity will remain the same as specified in the teaching guide.