Universidad Zaragoza

Academic Year/course: 2023/24

27003 - Computer Science I

Syllabus Information

Academic year: 2023/24
Subject: 27003 - Computer Science I
Faculty / School: 100 - Facultad de Ciencias
Degree: 453 - Degree in Mathematics
ECTS: 9.0
Year: 1
Semester: First semester
Subject type: Basic Education
Module:

1. General information

This is a basic training course, within the Mathematics degree, which aims to provide the student with the capacity for effective analysis and the necessary tools to be able to program a problem, from the formal aspect of its modeling to the concrete result of its implementation in a structured programming language.

It is part of the Computer Science module and precedes the subjects of Computer Science II, which introduces object-oriented programming, and Database Systems I and II. In addition to being fundamental for these, the methodology and tools acquired serve, in general, to approach from a practical point of view the solution of problems in many other subjects, such as those of the modules of optimization and numerical simulation, for example.

The approaches and objectives of this module are aligned with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda; the learning activities could contribute to some extent to the achievement of the goals 4 (quality education), 5 (gender equality), 8 (decent work and economic growth), and 10 (reducing inequality).

2. Learning results

- Know and understand the syntax and semantics of the basic constructs of a structured programming language.
- Be able to solve problems of low or medium complexity, designing and implementing algorithms that solve them.
- Be able to determine which data structures are the most appropriate to represent the information involved in a problem.
- Be able to design a top-down solution to a problem.
- Know the algorithms to solve the most frequent problems that arise when working with sequential and indexed data structures.

3. Syllabus

- Fundamentals of programming: binary representation, algorithms and programs, programming languages, the C language.
- Data types: variables, constants, operators and expressions.
- Control statements: sequential, conditional and iterative composition.
- Pointers and dynamic memory allocation.
- Arrays and strings.
- Top-down design: functions and recursion.
- Data structures.
- Sequential and direct access files.
- Sorting and searching algorithms.

4. Academic activities

Master classes: 40 hours.
Problem solving: 20 hours.
Computer classes: 30 hours.
Project: 40.5 hours.
Study: 90 hours.

Assessment tests: 4.5 hours.

5. Assessment system

- Practices: maximum weight 10%.
- Contributions to the blog of the subject: maximum weight 10%.
- Group work: maximum weight 30%.
- Final exam of the official call: minimum weight 70% (to pass this test, a minimum grade of 4 out of 10 must be obtained).

The student is also entitled to take a comprehensive exam to pass the course.