Universidad Zaragoza

29902 - Fundamentals of computing

Syllabus Information

Academic year: 2023/24
Subject: 29902 - Fundamentals of computing
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 435 - Bachelor's Degree in Chemical Engineering
ECTS: 6.0
Year: 1
Semester: 435-First semester o Second semester
107-Second semester
Subject type: Basic Education
Module:

1. General information

Objectives

- Enable the student to propose solutions to problems and create programs. The core content is the process of programming: problem specification, proposing alternative solutions as algorithms, choosing a solution through experimentation or previous experience, coding solutions in programs, executable by a computer, in general purpose programming languages.
- That the student knows the structure of a computer, its basic operation. Training to search for information, apply programming and troubleshooting skills in available tools and software applications

Sustainable Development Goals, SDGs - Agenda 2030 (https://www.un.org/sustainabledevelopment/es/) Goal 1 (Objective 1.4). Goal 8, Objective 8.2 Goal 16, Objective 16.5

2. Learning results

The student, in order to pass this subject, must demonstrate the following results....

- Ability to retrieve information (including browsers, search engines and catalogs).
- Know the basic operation of computers, operating systems and databases and create simple programs on them
- Ability to operate computer equipment effectively, taking into account its logical and physical properties
- Know and use with ease the tools and software applications available in the laboratories of the basic subjects
- Correctly pose the problem from the proposed statement and identify the options for its resolution.

Apply the appropriate solving method and identify the correctness of the solution.

- Ability to specify, design and build simple computer systems.

3. Syllabus

Blocks of the Program of the subject.

1. -**Computer: Machine running Algorithms**.

-Notion of Algorithm. Computer structure. Operating systems. Databases. Programming. computernetworks

2. -**Abstraction with Procedures.**

-Data types and algorithmic composition schemes. Constants and variables. Control structures, Procedures and Functions. Algorithm design techniques. Recursivity.

3. -**Abstraction with Data.**

-Tables. Indexed Access. Ordination. Abstract Data Types. Introduction to Programming Oriented to

-Objects.

The concepts, methods and tools will be illustrated with realistic examples from the field of chemical engineering, such as: mathematical computations, non-numerical information processing, simulation, optimization, etc

4. Academic activities

The learning process is based on:

- Lectures on the content of the subject (30 hours)

- Classroom problem solving. (15 hours)
- Personal study of the subject (60 hours)
- Laboratory practices that develop theoretical knowledge, through programs of increasing difficulty proposed by the teachers. (15 hours)
- Academic work (27 hours)
- Assessment tests (3 hours)

The learning process emphasizes both the student's attendance to lectures and the realization of laboratory practices throughout the term. In the realization of simple programs of increasing difficulty, and in the study individualized.

The calendar of the subject will be defined in the academic calendar of the Center.

5. Assessment system

ACTIVITIES

1. -**Practical laboratory work (30%).** The ability to identify the information needs for to solve the problems posed and their use in their resolution will be assessed (RA 1). Critical capacity will also be assessed at when selecting alternatives and the degree of justification of the solution reached (RA 5). Students will be assessed on their fluency in in the use of the computer to solve problems (RA 2 and RA 4). The solutions implemented for each of the exercises proposed for the practice sessions will also be assessed, taking into account the quality of the procedures and efficient resolution strategies on the computer (RA 3), as well as the quality of the program that implements such strategy (RA 3). The grade for this activity will be a score between 0 and 10.

2.-**Written test (70%)** in which questions and/or problems in the field of engineering will be posed to be solved by means of a computer, of similar type and level of complexity to the one used during the term. The quality and clarity of the resolution strategy (RA 5), as well as its efficiency (RA 2) will be assessed. The quality of the program, written in the general purpose programming language used during the course (RA 6), which realizes such a strategy (RA 3), will also be assessed. Serious semantic errors - ignorance of the basic rules of construction and coding of algorithms - may result in a total penalty for the exercise. To pass the subject a minimum grade of 4 out of 10 in this activity is required.

ORGANIZATION

The student will pass the subject by completing the activities listed in the previous section.

The overall assessment will be broken down into two parts. The first corresponds to the previous assessment activity numbered as 2 and with the weighting indicated therein. The second corresponds to the previous assessment activity numbered 1. The final grade will be equal to the weighted sum of the grades of each part, using the weightings indicated therein. The date will be specified well in advance by the center in the periods set aside for the conducting the tests at the center. The timetable for the tests will be defined by the teaching staff of the subject well in advance.

Students will be able to pass activity 1 during the term by taking and passing the tests that will be indicated sufficiently in advance . Students who have not passed activity 1 during the term will be required to take the second part of the global assessment. Students who have passed it during the term may, if they wish, apply for a higher grade on the dates of the global assessment.