Universidad Zaragoza

Academic Year/course: 2021/22

39607 - Computer Science

Syllabus Information

Academic Year: 2021/22
Subject: 39607 - Computer Science
Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia
Degree: 608 -
ECTS: 6.0
Year: 1
Semester: Second semester
Subject Type: Basic Education
Module:

1. General information

1.1. Aims of the course

To learn basic concepts for using computer applications and the basis of applications involved in Engineering. Also designing and debugging algorithms.

To show Software and hardware components necessary to implement and use network computers.

1.2. Context and importance of this course in the degree

The subject is mandatory. Is the first-year course and has 6 ECTS.

It provides an additional formation to a Mechatronic engineer in the computing area.

1.3. Recommendations to take this course

No previous programming knowledge is necessary.

2. Learning goals

2.1. Competences

Specifics

1. (EB03) Basic knowledge of computers use and programming, operating systems, databases and applications with use in engineering.
2. (EE05) Knowledge of microprocessors fundamentals and uses.
3. (EE11) Applied knowledge of industrial informatics and networks.

Generics

1. (GI03) Knowledge about basic and technology subjects that make them able to learn new methods and theories, and give them changeableness to adapt to new situations.
2. (GI04) Ability to problem solving with initiative, decision, creativity, critical reasoning and to communicate knowledge, capabilities and skills in Industrial Engineering and in particular in the industrial electronics field.
3. (GC02) To interpret experimental data, to compare with expected data and to elaborate conclusions.
4. (GC03) Ability to abstraction and logical reasoning.
5. (GC04) Ability to learn continuosly in a self guided and autonomous manner.
6. (GC05) Ability to evaluate options.

7. (GC06) Ability to adapt to quick evolving technologies.
8. (GC07) Ability to be a team leader, and also to be a compromised participant.
9. (GC08) Ability to find technical information, and to understand and valorate it.
10. (GC09) Positivity related to technological innovations.
11. (GC10) Ability to write technical documentation and to expose it with adequate computer tools.
12. (GC11) Ability to clearly communicate their reasoning and designs to specialized and non specialized people.
13. (GC15) Ability to analyze and to apply simplified models to hardware and technological solutions that will be able to make predictions about their behaviour.

2.2. Learning goals

Upon passing the subject, the student will be more competent to:...

- To identify and to evaluate fundamental criteria for computer systems design.
- To know how to select components and elements suitable to application.
- To acquire basic foundations of operating systems, communications and hardware.

2.3. Importance of learning goals

This subject has a strong engineering character, gives a formation with contents that can be applied immediately in jobs. Achieving the learning goals, the ability to understand the operation of computer systems -hardware and software- is obtained, which will be essential in order to design and to put in operation every application, factory, process, etc. included into the scope of Engineering.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that they have achieved the expected learning outcomes through the following assessment activities

The evaluation process will include two types of action:

- **A continuous evaluation system**, which will be carried out throughout the learning period.
- **A global assessment test**, reflecting the achievement of learning results, at the end of the teaching period.

1-Continuous evaluation system.

Following the spirit of Bologna, regarding the degree of involvement and continued work of the student throughout the course, the evaluation of the subject considers the continuous evaluation system as the most appropriate to be in line with the guidelines set by the new framework from the EHEA.

The continuous evaluation system will have the following group of qualifying activities:

- **Works:** The works will consist of practical exercises, solution to proposed problems, questionnaires, etc. The correctness and quality of the results will be assessed. The percentage with respect to the global mark of all these works will be 30%.
- **Assessment tests:** There are two throughout the course. The percentage with respect to the global mark of each evaluation test will be 35%.

It is necessary to pass the works and written tests separately so that they can contribute to the average of the final grade.

To opt for the Continuous Assessment system, you must attend at least 80% of the face-to-face activities (practices, technical visits, classes, etc.)

2-Global final evaluation test.

The student must opt ??for this modality when, due to their personal situation, they cannot adapt to the rhythm of work required in the continuous evaluation system, have suspended or want to upload a grade having participated in said evaluation methodology.

The global final evaluation test will have the following group of qualifying activities:

- **Exam:** It is carried out in the official calls. This option can always be followed even though the student has used the

continuous assessment system.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The course is strongly based on practice, so it has many practical works in classes.

- Lectures: Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamental, structuring them in topics and or sections, interrelating them.
- Practice Sessions: The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.
- Laboratory Workshop: The lecture group is divided up into various groups, according to the number of registered students, in order to make up smaller sized groups.
- Individual Tutorials: Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

If classroom teaching were not possible due to health reasons, it would be carried out on-line.

4.2. Learning tasks

The course includes the following learning tasks:

Face-to-face generic activities:

- Lectures: The theoretical concepts of the subject are explained and illustrative examples are developed as a support to the theory when necessary.
- Practice Sessions: Problems and practical classes are carried out, complementary to the theoretical concepts studied.
- Laboratory Workshop: This work is tutored by a teacher.

Generic non-class activities

- Study and understanding of the theory taught in the lectures.
- Understanding and assimilation of the problems and practical classes solved in the practical classes.
- Solving proposed problems, project, etc.
- Preparation of laboratory workshops, preparation of summaries and reports.
- Preparation of the written tests for continuous assessment and final exams.

4.3. Syllabus

The course will address the following topics:

1-Theoretical contents

Part I

- Computer: Machine that executes algorithms. Algorithm definition. Computer architecture: digital nature, codification, hardware, software.
- Operating systems.
- Databases
- Programming: programming styles, language hierarchy, programming elements
- Nets of computers.

Part I

- Introduction
- Function design
- Text and input/output
- Conditional branching
- Introduction to classes and objects

- Lists
- Iteration

Part III

- Other collections: sets, tuples, dictionaries
- Designing algorithms
- Search and sorting
- Files

Part IV

- Classes, objects and methods

2-Practical contents

Every part has related practices. As the concepts are shown, the practices are going to be presented, in the classroom or in the moodle platform.

4.4. Course planning and calendar

The subject has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class.

A summary of a weekly timetable guide can be seen in the following table.

- 1 hour of lectures
- 3 hour of laboratory workshops
- 6 hours of other activities

Nevertheless, the previous table can be shown in greater detail, taking into account the following overall distribution:

- 16 hours of lectures.
- 42 hours of the laboratory workshop.
- 2 hours of written assessment tests, one hour per test.
- 45 hours of exercises and guided work, divided up the 15 weeks of the second semester.
- 45 hours of personal study, divided up the 15 weeks of the second semester.

There is a tutorial calendar timetable set by the teacher that can be requested by the students who want a tutorial.

4.5. Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=39607&year=2021