29603 - Computer studies

Información del Plan Docente

Academic Year	2018/19
Subject	29603 - Computer studies
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	430 - Bachelor's Degree in Electrical Engineering
ECTS	6.0
Year	1
Semester	Half-yearly
Subject Type	Basic Education
Module	

1.General information

1.1.Aims of the course

The subject and the expected results have the following objectives:

- To train the student so he can create simple programs to solve a problem. Therefore, programming is the basic and nuclear element and, in particular, the specification of the problems, the proposal of different algorithmic solutions, the choosing of the best solution based on experimentation, and the translation of these solutions into executable files using a general-purpose programing language.
- That the students learn the computer components and understand their basic operations. They have to be able to seek information and apply the problem solving knowledge using the available software tools and applications.

1.2.Context and importance of this course in the degree

Computer science is a basic subject taught in the first year of the degree. This particular temporary location allows students to apply the acquired knowledge in all subjects of the degree, most of which need to rely on software tools for problem solving.

1.3.Recommendations to take this course

This course introduces the student in the use of a computer for solving problems. The tool is introduced from the beginning. This includes a general use perspective and particular aspects aimed at solving specific problems. To take this course the student must be willing to develop skills for problem solving using a computer through continuous practical work, which cannot be replaced by any other learning technique.

2.Learning goals

2.1.Competences

To pass the course, students will be competent to ...

- Solve problems and make decisions with initiative, creativity and critical thinking.
- Apply information and communication technologies in Electrical Engineering.

29603 - Computer studies

- Use computers, operating systems, programming environments, databases and software with applications in engineering.

2.2.Learning goals

The student must show the following results:

- Knowledge of the basic operation of computers, operating systems and databases, and ability to create simple programs on them.
- Ability to operate computer equipment effectively, taking into account their logical and physical properties.
- Ability to use environments for program development.
- Ability to propose low-medium complexity solutions for information processing problems in the world of engineering.
- Ability to design and implement correct programs for problem solving.
- Ability to retrieve information from sources in digital media (including browsers, search engines and catalogues).

2.3.Importance of learning goals

This subject is the first contact of students with the concepts and skills that form the "way of thinking of the engineer". This subject applies these concepts in real problems from the beginning. Computer science deals with knowledge, design and operation of computers and computer technology, constituting a discipline that:

- Develop the ability to express solutions as algorithms, and the role of these algorithms in areas such as system design, problem solving, simulation and modelling.
- It requires a disciplined approach to problem solving.
- Controls the complexity of the issues, first through abstraction and simplification, then through component integration.
- Facilitates the understanding of the opportunities offered by process automation, and how people interact with computers.
- Facilitates learning through experimentation, basic principles like concision and elegance, and to recognize bad practices.

3.Assessment (1st and 2nd call)

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

The student must demonstrate that it has achieved the intended learning outcomes through the following evaluation activities.

Practical tests (40%):

They consist of a set of laboratory exercises done individually and a practical group project. The evaluation of the exercises will be done along the course and the practical project will be done at the end of the course. The schedules will be defined by the teacher in advance.

In the laboratory exercises, the implemented solutions for each exercise will be evaluated. The evaluation will be based on the quality of the procedures and the strategies used for efficient resolution. In the practical project, the ability to identify information needs to solve the problem will be evaluated. In addition, the selected alternatives and the justification of the solution will be reviewed.

As alternative to the evaluation of laboratory exercises, a final practical exam that tests the skills to acquire will be done.

Final written exam (60%):

29603 - Computer studies

A written test containing questions and / or problems in the engineering field of type and complexity similar to the used during the course will be done. The quality and clarity of the resolution strategy will be assessed. Serious errors in the basic rules of construction and coding of algorithms may cause the exam to fail.

In order to pass the course, the student's final grade in the test must be greater than or equal to 5 points out of a total of 10. In addition, the rating of each of the three parts (practical, work and written exam) should be, individually, greater than or equal to 5 points out of 10.

Evaluation in September. The evaluation will be analogous to the one in February, with the same weights and minimum requirements. Student grades obtained in February are maintained in September, unless the student chooses to do the corresponding test, in which case the new rating will prevail.

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The learning process for this course is based on the following:

- Continuous work and study starting on the first day of the course is required.
- Basic concepts and techniques will be learnt in theory classes, in which participation of the students will be fostered.
- The acquired concepts will be applied to the solution of practical exercises and problems. Students should play an active role, discussing problems and possible solutions.
- Laboratory classes will serve as a means for the students to learn the necessary tools to implement algorithms using the concepts presented in theory classes and used in practical exercise classes.
- Team work, which is required for the consecution of the project in which each team must implement a complete computer program.

The course has both a theoretical and a practical orientation. Thus, the learning process emphasizes both the attendance of students to theory and exercises classes, as well as laboratory classes and individual study.

4.2.Learning tasks

The following learning activities are offered to the student to help her/him accomplish the expected results:

- In class, the teachers will present the topics covered by the course through theory classes, analysis of practical exercises, and problem solving, in which the concepts and techniques previously presented will be used.
- Laboratory classes will take place in a computer-equipped laboratory. Throughout them, the students are required to complete assignments related to the topics covered by the course.
- Additionally, an assignment will be conducted in teams, under the professor's tutorship. Each team will have to develop a program which solves a specific task given to the students.

4.3.Syllabus

Course syllabus

- Introduction to computer science.
- Simple data types.
- Control structures.
- Indexed data types.
- Instruction abstraction.
- Data abstraction.
- Data persistence.

29603 - Computer studies

4.4.Course planning and calendar

Calendar of class sessions and assignment deadlines

The course is organized as follows:

- Class sessions (theory and problem solving): 3 hours per ordinary week. From them, globally, approximately 2 hours/week correspond to theory classes and 1 hour/week to problem solving classes, in accordance with the calendar established by EINA.
- Laboratory sessions: A 2 hour-session each laboratory week, adjusted according to the academic calendar established by the direction at EINA, and laboratory reservations. These are work sessions in which the actual practical development tools are used, under supervision of a teacher.
- Tutoring (office) hours for team assignments in which the students implement different types of programs.

Assignment presentations, subject to evaluation:

- Laboratory assignments and the project assignment will be handed in before the established deadline, which will be announced both in class and in the Moodle platform.

Work to be carried out by the student:

The number of hours the student should devote to this course to achieve the learning objectives is 150, distributed as follows:

- 60 hours, approximately, of attendance to classes (theory (30 hours), problem solving (10 hours), and laboratory classes (20 hours)
- 20 hours of team work to complete the project assignment
- 55 hours of individual, effective, study and work (studying notes and texts, solving problems, preparing classes and laboratory sessions, implementing programs, etc.)
- 5 hours devoted to the different evaluation tests.

Detailed description of the activities to perform in the course will be indicated once the university has approved the academic calendar. In any case, the student must be aware of the task deadlines defined during the course, as well as exam dates. These dates will be announced at the beginning of the course.

4.5.Bibliography and recommended resources