Universidad Zaragoza

29919 - Fundamentals of electronics

Syllabus Information

Academic year: 2024/25
Subject: 29919 - Fundamentals of electronics
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 435 - Bachelor's Degree in Chemical Engineering
ECTS: 6.0
Year: 3
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The subject covers the training requirement in the subject Fundamentals of Electronics contained in the Module of Compulsory Industrial Branch of the Degree in Chemical Engineering. This degree qualifies for the profession of Chemical Engineer.

Today, the efficient management of many machines, motors and industrial plants, and the monitoring and control of processes requires the use of electronics. With Power Electronics it is possible to control motors and automation, while Analog Electronics and Digital Electronics allow to capture sensor data, analyze the information and make management decisions quickly and accurately, thus controlling the work of actuators in processes.

It is recommended that the student has taken the course "Fundamentals of Electrical Engineering" of the second course and "Fundamentals of Computer Science" of the first course.

2. Learning results

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

1. Identify the applications and functions of electronics in engineering.

2. Recognize the basic electronic components and devices used for various electronic functions.

3. Know how to use the basic techniques for the analysis of analog, digital and power electronic circuits.

4. Ability to design analog, digital and power electronic circuits at the block level.

5. Handle the instruments of a basic electronics laboratory and uses electronic simulation tools.

3. Syllabus

THEORETICAL PROGRAM

Block 0. Introduction. General, instrumentation and simulation.

Block 1. Devices and basic functions.

Block 2. Analog: Sensing and conditioning.

Block 3. Digital: Control and visualization.

Block 4. Regulated power: Power supplies.

Block 5. Switched P: Power control.

PRACTICAL PROGRAM

P1) Laboratory instrumentation.

P2) Laboratory instrumentation + sensorization.

P3) Introduction to Arduino.

P4) Control and visualization system based on microcontroller.

P5) Power supply.

P6) Arduino Project.

4. Academic activities

WORKING HOURS WITH TEACHER

Master classes (30 hours): The contents are approached through the presentation of the functions that electronics plays in the field of engineering in general and chemical engineering in particular.

Classroom practice (15 hours): In this activity, application problems are solved in a participatory manner.

Laboratory practices (15 hours): The electronics laboratory is a scenario with which the student is not familiar, and in which he/she has to learn to maintain a necessary attitude of seriousness, prudence and observance. The students will be required to come to the laboratory class with the practice they are going to do properly prepared. At the end of each session the student will take a Moodle quiz where he/she will demonstrate the knowledge acquired during the practical session.

PERSONAL WORKING HOURS

Practical work (30 hours): These assignments are related to the preparation of the continuous assessment activities. The specific activities to be carried out will be communicated in class and in the moodle platform of the subject.

Personal study and work (55 hours): It is very important that the student develops in a constant way, and distributed throughout the semester, personal work of study and problem solving.

Tutoring: Students who wish to do so may ask the teacher any questions they may have about the subject. For this purpose, the student has a tutoring schedule.

Assessment (5 hours): In addition to the grading function, the assessment is also a learning tool with which the student verifies the degree of understanding and assimilation he/she has reached of the subject matter.

5. Assessment system

There are two possible itineraries for which the student will only be able to choose one of them.

- Itinerary 1: Continuous Assessment

Laboratory Practices (**20%**)

They will be graded by means of a questionnaire at each practice session. CL rating from 0 to 10 points.

These are mandatory activities. In case of not having done any laboratory practice, the grade of the practical part can never be higher than 3.5 points.

Continuous assessment activities (**30%**)

Assessable activities will be carried out throughout the semester. It is optional, but the student must complete all the activities programmed by the teacher (normally four in total) to qualify for this part in the continuous assessment. Otherwise, the theoretical-practical exam for this itinerary will be weighted at 80%. EC rating from 0 to 10 points.

Theoretical-practical test (**50% ***)

Composed of theoretical-practical questions and problems, to be carried out in the official calls. The correctness of answers, developments, designs and numerical results will be valued. CT rating from 0 to 10 points. The minimum grade for this part, required to pass the subject, will be 3.5 points.

(*) The theoretical-practical exam will have a weighting of 80% if the student does not complete all the continuous assesment activities.

- Itinerary 2: Global Assessment

The student's global assessment will be carried out in the two official calls. The following testswill be held on both dates:

- Theoretical-practical test: CT grade from 0 to 10 points. It will account for **75%** of the overall grade, and will require a minimum grade of 3.5 points for this part.
- Laboratory test: CL rating from 0 to 10 points. It will account for **25%** of the overall grade. The test will consist of the implementation of circuits and systems similar to the ones developed during the term in the laboratory practice sessions . The minimum grade for this part, required to pass the subject, will be 4 points.

*The subject is passed with an overall grade of at least 5 out of 10

6. Sustainable Development Goals

7 - Affordable and Clean Energy
9 - Industry, Innovation and Infrastructure
12 - Responsible Production and Consumption