

## 30022 - Basic principles of electronics

### Syllabus Information

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**Academic Year:** 2020/21

**Subject:** 30022 - Basic principles of electronics

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 436 - Bachelor's Degree in Industrial Engineering Technology

**ECTS:** 6.0

**Year:** 3

**Semester:** First semester

**Subject Type:** Compulsory

**Module:** ---

## 1.General information

### 1.1.Aims of the course

### 1.2.Context and importance of this course in the degree

### 1.3.Recommendations to take this course

## 2.Learning goals

### 2.1.Competences

### 2.2.Learning goals

### 2.3.Importance of learning goals

## 3.Assessment (1st and 2nd call)

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

## 4.Methodology, learning tasks, syllabus and resources

### 4.1.Methodological overview

**Learning process designed for this subject is based on the following principles:**

Learning process is developed through three main levels: lectures, exercise solving and laboratory practices, with increasing participation from the student.

- In lectures, theoretical basis of electronic systems will be shown having several examples to illustrate them.
- In exercise solving sessions, several exercises will be explained and solved with student participation.
- Laboratory practical sessions, will be developed in small groups. The student will implement and test electronic circuits shown in the lectures and exercise sessions.

Materials for the subject will be available in the virtual platform *Moodle* of the University of Zaragoza, from which the student will be able to download the following documents:

- Presentation of the subject. Includes contact data for teachers, timetables of tutorials, classes, laboratory practices, and evaluation dates. It also will include evaluation criteria for the different learning activities; objective description and subject program, and the most relevant bibliographic references.
- Slides for the lectures
- Manuals for the laboratory practices, and descriptive guide about instruments in the laboratory.
- Data sheet of main electronic components used in practices.
- Collection of small questions of theoretical/practical type to give support for evaluation preparation.
- Collection of exercises to be solved to give support to evaluation activity.

- Collection of exams of past courses with solutions

## 4.2.Learning tasks

The course includes 6 ECTS (150 hours) organized according to:

### **Lectures (30 hours) (classroom teaching)**

This activity presents fundamental contents of the subject and is done in the classroom in face-to-face modality.

### **Practical learning activity in classroom (face to face activity) (15 hours)**

In this activity, different exercises applying fundamental contents are solved in the classroom in a participative way. Students are encouraged to try and solve previously the exercises.

### **Laboratory sessions (15 hours) (face-to-face activity)**

Students have the practical exercises manual available in university server. They include a description of the circuits to be implemented and indications to develop the activity. In order to achieve an adequate effectiveness of this work, students must come to this classes with the practical exercise previously prepared.

### **Autonomous work (85 hours) (non face-to-face)**

This section includes the previous work required to prepare laboratory sessions.

It is very important that the student develops study and exercises resolution in a continuous way during the subject.

Regularly the student will get proposals of exercises to solve. Some of them will be solved in classroom classes.

### **Tutorials (face-to-face)**

Teachers are available for tutorials with students in a specific timetable, so they can ask any doubts and questions about the subject.

### **Evaluation (5 hours) (face-to-face)**

Moreover to determine the grades of evaluation, it is also a learning tool with which the student may test his/her own degree of comprehension and assimilation of the subject.

## 4.3.Syllabus

The course will address the following topics:

### Theory sessions

Topic 1. Pre-requisites

Topic 2. Semiconductors. Diodes

Topic 3. Bipolar transistor

Topic 4. Unipolar transistor

Topic 5. Transistor based voltage and current sources

Topic 6. Transistor switching

Topic 7. Introduction to digital devices

Topic 8. Operational amplifier (OA)

Topic 9. OA based non-linear stages

Topic 10. Amplifiers

Topic 11. OA base linear stages

Topic 12. Non-ideal operational amplifier

Topic 13. Frequency response

### Laboratory sessions

Session 1. Introduction to electronics laboratory

Session 2. Diodes. Linear power supply.

Session 3. Electronic control of the speed of a DC motor

Session 4. Digital electronics based PWM generator to control the speed of a DC motor

Session 5. Analog electronics based PWM generator to control the speed of a DC motor

Session 6. Audio Amplifier

## 4.4.Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course, please refer to the Escuela de Ingeniería y Arquitectura de la Universidad de Zaragoza (EINA), website, <https://eina.unizar.es/>.

## 4.5.Bibliography and recommended resources

Link:

[http://biblos.unizar.es/br/br\\_citas.php?codigo=30022&year=2019](http://biblos.unizar.es/br/br_citas.php?codigo=30022&year=2019)

