

## 29615 - Basic principles of electronics

### Syllabus Information

**Academic Year:** 2019/20

**Subject:** 29615 - Basic principles of electronics

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

**Degree:** 430 - Bachelor's Degree in Electrical Engineering

**ECTS:** 6.0

**Year:** 2

**Semester:** Second 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

The learning process that is designed for this subject is based on the following:

The teaching process is guided by the need to the solution: circuits and devices. First, the scenario is presented. Second, most representative electronic systems are identified for covering the previously stated requirements. Third, the electronic devices are presented, studying its operating principle. At last, the design stage is reached. To do this, the course practices are presented, so that theory and practice are perfectly imbricated.

Regarding activities with the whole group, they are divided into lectures and classroom practices, in which application problems are solved. Student participation in these activities is sought. In parallel, the student must study and prepare problems for better utilization of classes.

Besides, laboratory practices are mandatory. They are distributed throughout the semester and they are evaluated for the final course result. Students work in pairs. The prior preparatory practical work is individual and the manuscript has to be given to the teacher at the beginning of every practice session. The development of the practice is carried out jointly and a single manuscript report has to be given to the teacher at the end of the session. Practice results should be highlighted.

The autonomous work of the student and his application for solving exercises is essential in his learning process and for overcoming evaluation activities.

The material for the development of the course will be available in the virtual platform "Moodle" from the University of Zaragoza from which students can download the following documents:

- a) Presentation of the course: teaching guide of the course, contact data of the teachers and the tutorial schedule.
- b) Materials for lectures.

- c) Guides for the practice sessions.
- d) Other materials that may be of interest.

## 4.2.Learning tasks

The programmed activities to help the students for achieving the expected results include the following activities:

### 1: Lectures (30 hours) (face)

Fundamental contents of the course are exposed in the classroom, so it is a face activity.

### 2: Classroom practices (15 hours) (face)

Many application problems are solved in a participatory manner in the classroom. The teacher proposes problems and students are encouraged to prior solving the problems at home.

### 3:Laboratory Practice (15 hours) (face)

Six practice sessions are mandatory. Students have guides for the practices which have been provided in advance. These guides contain a description of the electronic assemblies, the guidelines for the development of the activity and some questions about the theoretical or practical content of the session.

Each student must prepare, handwritten way, the previous work of the practice. This work should contain everything necessary for the realization of the practice, an estimation of the results and the responses to the questions indicated on the practice guide. The work has to be given to the teacher at the beginning of every practice.

Students will be distributed in the available laboratory places at the rate of two students per place (maximum). At the end of practice and for each place, students have to give a handwritten memory of the development of the practice, emphasizing the results achieved.

The laboratory is an unfamiliar scenario for students and they must learn to maintain an attitude of seriousness, of prudence and of order.

### 4: Practical work (12 hours) (non-face)

These works relate to the preparation of the practical sessions. They are scheduled in a non-face manner. The individual and handwritten work have to be prepared by the student.

### 5: Study and personal work (75 hours) (non-face)

It is very important that students develop their work steadily throughout the semester. The autonomous work of the student and his problem solving is essential for good evaluation results.

### 6: Tutorials (face)

The teacher is available for the students in the tutorial schedule for solving their doubts.

### 7: Evaluation (3 hours) (face)

In addition to the qualifying function, evaluation is also a learning tool with which the students realize the degree of understanding and assimilation that have reached about the course.

## 4.3.Syllabus

The course syllabus is as follows:

1. Introduction.
2. Diodes and linear power supplies.
3. Bipolar Junction Transistors (BJT) and Field Effect Transistors (MOSFET).
4. Operational Amplifiers.
5. Digital Electronics.

The course practices are:

1. Instrumentation of the laboratory and electromechanical dynamics.
2. Diodes and power supplies.
3. Analog speed control of a motor with BJT and MOSFET.
4. Temperature control using operational amplifiers.
5. Pulse width modulation (PWM) using operational amplifiers.
6. Digital speed control of a motor.

## 4.4.Course planning and calendar

Schedule of the sessions

Lectures, problem classes, and practice sessions are arranged accordingly to the schedule published by the secretariat of the EINA. The schedule is published before the start date of the course.

Each teacher informs about his tutorial schedule and its modification throughout the semester if it happens.

The other activities will be planned depending on the number of students and will be announced in advance.

## 4.5.Bibliography and recommended resources

<http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=7771&p=1>