

## 39626 - Power Electronics

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 39626 - Power Electronics

**Faculty / School:** 175 - Escuela Universitaria Politécnica de La Almunia

**Degree:** 608 -

**ECTS:** 6.0

**Year:** 3

**Semester:** Second semester

**Subject type:** Compulsory

**Module:**

### 1. General information

The general objective of the subject is to provide the necessary knowledge to interpret and solve electronic circuits of power control, especially in the areas of static switches, rectifiers, rectifiers, regulators and power inverters.

This requires the correct use of the most common computer applications to obtain information on power components and their applications and also the correct interpretation of the technical documentation of the components used, as well as the computer applications for circuit simulation.

The correct use of the measuring and power supply devices commonly used in the electronics laboratory must also be achieved, as well as the correct interpretation of the measurements taken.

### 2. Learning results

- Interpret and solve analog and digital electronic circuits.
- Acquire programming skills in  $\mu P$ .
- To know sensor and transducer typologies.
- Master simulation tools and basic laboratory instruments.
- Understand and interpret commercial equipment documentation.
- Drawing and interpreting plans and diagrams according to the appropriate standards and symbology.

### 3. Syllabus

Introduction to power electronics

Electronic power amplifiers

- AC-DC converters (rectifiers)
- DC-DC converters
- DC-AC (inverter) and AC-AC converters

Power electronic devices

- Power diodes and thyristors
- Power transistors
- Other power devices

Introduction to stage control (PWM)

### 4. Academic activities

- Theoretical classes: The theoretical concepts of the subject will be explained and the following practical examples will be developed
- Types of problems: The teacher solves problems or case studies for illustrative purposes. This type of teaching complements the theory presented in the lectures with practical aspects
- Tutored problem solving: Students will develop examples and carry out problems or case studies related to the theoretical concepts studied.
- Laboratory Practices: The total group of theory classes may or may not be divided into smaller groups, as appropriate. Students will perform assemblies, measurements, simulations, etc. in the laboratories in the presence of the practical teacher.
- Tutored autonomous activities: These activities will be tutored by the faculty of the subject.
- Reinforcement activities: Through Moodle, various activities will be conducted to reinforce the basic contents of the

subject. Its performance will be monitored through the same.

## 5. Assessment system

The members of the student body will be able to choose the following evaluation modalities:

### Continuous evaluation:

The subject is divided into two thematic blocks. The students who opt for this mode of evaluation may take a partial test, corresponding to block 1 of the subject. This evaluation test will take place throughout the term. Those members of the student body who achieve a minimum grade of 4 points will be able to promote this block until the ordinary exam.

The students who have reached the minimum grade of 4 points in the first partial, will be able to take the evaluation test corresponding to block 2 of the course on the day of the ordinary exam. In case of not having reached the minimum grade, students will have to take the evaluation test corresponding to blocks 1 and 2 together.

Partial	Ordinary Call	Grading Theoretical-Practical Written Exams
Grade for Partial Test Block 1 $\geq 4$	Grade for Partial Test Block 2	Grade Block 1 (50%) + Grade Block 1 (50%) [grade $\geq 4$ for averaging]
Grade for Partial Test Block 1 $< 4$	Grade Test Blocks 1 and 2	Grade Test Blocks 1 and 2 [grade $\geq 4$ for averaging].

The specific weight of the theoretical-practical and laboratory practical tests is shown in the following table:

Grading Written Tests	Theoretical-Practical Grading Laboratory Practices
70% [grade $\geq 4$ for averaging]	30% [grade $\geq 4$ for averaging]

To qualify for this evaluation mode, students must attend 80% of the practical sessions.

Students who have not passed the course, but have achieved a minimum grade of 4 points in the laboratory practices, will be able to promote this grade to the ordinary and extraordinary exams.

To pass the course a grade of 5 points must be achieved and a minimum of 4 points must be obtained in each of the parts.

### Global Test

It will consist of a single written test that will contain theoretical and practical questions related to the syllabus of the subject and to the laboratory practices.

The specific weight of the questions in each of the parts will be, needing to obtain a grade of 4 points out of 10 in each of them to average:

	Percentage
Written test theoretical-practical part	70 % [grade $\geq 4$ for averaging]
Written test laboratory practical part	30 % [grade $\geq 4$ for averaging]

To pass the course a grade of 5 points must be achieved and a minimum of 4 points must be obtained in each of the parts.

## 6. Sustainable Development Goals

- 4 - Quality Education
- 5 - Gender Equality
- 7 - Affordable and Clean Energy