

**Información del Plan Docente**

<b>Academic Year</b>	2018/19
<b>Subject</b>	29621 - Power Electronics
<b>Faculty / School</b>	110 - Escuela de Ingeniería y Arquitectura
<b>Degree</b>	430 - Bachelor's Degree in Electrical Engineering
<b>ECTS</b>	6.0
<b>Year</b>	3
<b>Semester</b>	First semester
<b>Subject Type</b>	Compulsory
<b>Module</b>	---

**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 course will be based on combining theoretical explanations with practical exercises and laboratory work.

- Lectures will provide theoretical background on fundamentals of power electronics.
- Case studies and real applications will be worked out at the classroom.
- The students will do laboratory work in small groups, building, testing and analyzing power electronic circuits.
- Individual and group assignments will be proposed.
- Student participation is considered very important in order to acquire the learning outcomes and skills needed.

## 4.2.Learning tasks

### Classroom activities 2.4 ECTS (60 hours)

#### 1) Course lectures (T1) (30 hours).

The fundamentals of power electronics including essential background concepts are presented and illustrated with real examples.

#### 2) Case studies (T2) (15 hours)

Different case studies will be worked out at the classroom. Students are encouraged to prepare them in advance. Assignments could also be worked out in this part.

#### 3) Laboratory work (T3) (15 hours).

Five laboratory sessions will be carried out. Each session will be evaluated in the laboratory. Students have to prepare sessions in advance.

### personal work: 3.6 ECTS (90 hours)

#### 4) Assignments (T6) (4 hours)

Individual and group assignments will be proposed

#### 5) Personal study (T7) (82 hours)

Continuous study will be promoted among students. They can also attend tutorials to solve the specific problems they can face in the course

#### 6) Evaluation activities (T8) (4 hours)

Assessment will be based on coursework (laboratory work and assignments) and final examination

## 4.3.Syllabus

- \* Introduction to power electronics
- \* Power Converter Topologies
  - AC-DC converters (rectifiers)
  - DC-DC converters.
  - DC-AC converters (inverters)
  
- CA-CA converters
- Resonant Converters: generalities
- \* Power Semiconductor Devices

## 29621 - Power Electronics

- Diode, SCR, TRIAC, GTO
- BJT, MOSFET, IGBT
- Other power electronic devices
- \* Introduction to microcontroller-based power electronic control

### 4.4. Course planning and calendar

Timetables for classroom and laboratory sessions will be published prior to the beginning of the course at the web of the EINA <https://eina.unizar.es/> and EUPT <https://eupt.unizar.es/>

### 4.5. Bibliography and recommended resources