

## 29621 - Power Electronics

### Información del Plan Docente

<b>Academic Year</b>	2016/17
<b>Academic center</b>	110 - Escuela de Ingeniería y Arquitectura
<b>Degree</b>	430 - Bachelor's Degree in Electrical Engineering
<b>ECTS</b>	6.0
<b>Course</b>	3
<b>Period</b>	First semester
<b>Subject Type</b>	Compulsory
<b>Module</b>	---

### **1.Basic info**

#### **1.1.Recommendations to take this course**

#### **1.2.Activities and key dates for the course**

### **2.Initiation**

#### **2.1.Learning outcomes that define the subject**

#### **2.2.Introduction**

### **3.Context and competences**

#### **3.1.Goals**

#### **3.2.Context and meaning of the subject in the degree**

#### **3.3.Competences**

#### **3.4.Importance of learning outcomes**

### **4.Evaluation**

### **5.Activities and resources**

#### **5.1.General methodological presentation**

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.

## **5.2.Learning activities**

### **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

## **5.3.Program**

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

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

### 5.4.Planning and scheduling

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/>

### 5.5.Bibliography and recommended resources

*Bibliography* can be found in <http://psfunizar7.unizar.es/br13/eGrados.php?id=220>