

30028 - Power Electronics

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	436 - Bachelor's Degree in Industrial Engineering Technology
ECTS	6.0
Course	3
Period	Second semester
Subject Type	Compulsory
Module	---

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

Course grading

The course is evaluated according to the following items:

Final exam (CT)

Laboratory classes (CL)

The final grade (CG) is obtained using the following equations:

$$CG_{\text{Gaux}} = 0.25 \times CL + 0.75 \times CT$$

$CG = CG_{\text{Gaux}}$ if $(CL \geq 4 \text{ and } CT \geq 4)$, otherwise $CG = \min\{4, CG_{\text{Gaux}}\}$

5. Activities and resources

5.1. General methodological presentation

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The course includes lectures, exercises and laboratory sessions.

- The theoretical basis of digital and power electronic systems will be shown in lectures, illustrated with numerous examples.
- Several sessions will be devoted to apply the theoretical concepts to solve problems and case studies.
- Laboratory sessions will be conducted in small groups where students simulate, program and assemble circuits and check their operation.

5.2.Learning activities

3 hours of classes every week with lectures and problem resolution, plus five 3-hour laboratory sessions, one per week for selected weeks throughout the semester. Students will work in groups of two in the laboratory, and the lab reports will be prepared in pairs too.

Moodle platform will be used to communicate announcements and is where students will submit lab reports.

5.3.Program

Lecture outline:

1. Fundamentals of Microcontrollers.
2. Digital Design with the MSP430 Microcontroller Family.
3. Fundamentals of Power Electronics.
4. DC-DC Power Converters.
5. DC-AC and AC-AC Power Converters.
6. Rectifiers.
7. Power Electronics Technologies.

Brief description of laboratory sessions

1. Introduction to the Design with Microcontrollers.
2. PWM Motor Speed Control with Microcontroller.
3. DC-DC Converteres: Simulation and Hands-On.
4. Power Inverters Simulation and Demo.
5. Lamp Dimmer with a Microcontroller Driven Thyristor.

5.4.Planning and scheduling

Lectures, problem and laboratory sessions are held according to schedule set by the EINA (schedules available on their website).

5.5.Bibliography and recommended resources

The students could find resources in the library, for example clicking on <http://biblioteca.unizar.es/como-encontrar/bibliografia-recomendada>

All course materials are posted on Moodle.