

**Información del Plan Docente**

<b>Academic Year</b>	2018/19
<b>Subject</b>	30046 - Digital Electronic Systems
<b>Faculty / School</b>	110 - Escuela de Ingeniería y Arquitectura
<b>Degree</b>	436 - Bachelor's Degree in Industrial Engineering Technology
<b>ECTS</b>	6.0
<b>Year</b>	4
<b>Semester</b>	First semester
<b>Subject Type</b>	Optional
<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)**

The final grade for this course is based on the following weighting:

- Final exam (50 % of grade)
- Laboratory work: **pre-lab assignments**, attitude, accomplishment during laboratory session , and **lab** reports (50 %)

**4.Methodology, learning tasks, syllabus and resources****4.1.Methodological overview**

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, laboratory sessions, autonomous work, and tutorials.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class

### 4.2.Learning tasks

The course includes 6 ECTS organized according to:

- Lectures (1.8 ECTS): 45 hours.
- Laboratory sessions (0.6 ECTS): 15 hours.
- **Assignments** (1.0 ECTS): 25 hours.
- Autonomous work and study (2.4 ECTS): 60 hours.
- Assessment (0.2 ECTS): 5 hours.

#### Notes:

**Lectures:** the professor will explain the theoretical contents of the course and solve illustrative applied problems. Lectures run for 2 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended. Lectures will be complemented by problem-solving sessions (1 weekly hour) .

**Assignments:** students will prepare pre-lab assignments and lab reports. Pre-lab assignments are due at the beginning of the lab session.

**Autonomous work and study:** students are expected to spend about 60 hours to study theory, solve problems, and prepare the final exam.

**Tutorials:** the professor's office hours will be posted on Moodle and the degree website to assist students with questions and doubts. It is beneficial for the student to come with clear and specific questions.

### 4.3.Syllabus

The course will address the following topics:

#### Lectures

Topic 1. Implementation technologies of Digital Circuits (6 hours).

Topic 2. Designing Digital Circuits using VHDL (14 hours).

Topic 3. MSP430 Microcontroller Basics (8 hours).

Topic 4. Digital to Analog and Analog to Digital Conversion (6 hours).

Topic 5. Implementation of LTI discrete-time systems (6 hours)

Topic 6. Digital Data Communication Techniques (5 hours).

### Laboratory sessions

Session 1. Introduction to Digital Circuit Design using Xilinx ISE Tools.

Session 2. Angular velocity measurement of a dc motor in real time with an FPGA.

Session 3. PWM generation to control a servo motor using an FPGA.

Session 4. Digital voltmeter design using an MSP430.

Session 5. Sine wave generator design using an MSP430.

### **4.4.Course planning and calendar**

Lectures run for 3 weekly hours. Laboratory sessions will take place every 2 weeks (5 sessions in total) and last 3 hours each.

For further details concerning the timetable, classroom and further information regarding this course, please refer to the EINA website (<https://eina.unizar.es>).

### **4.5.Bibliography and recommended resources**

All course materials are posted on Moodle (<https://moodle2.unizar.es>).

Moodle will be also used to communicate announcements and is where students will submit laboratory reports.

Basic bibliography could be found in the library site