

Academic Year/course: 2022/23

## 30046 - Digital Electronic Systems

### Syllabus Information

**Academic Year:** 2022/23

**Subject:** 30046 - Digital Electronic Systems

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 436 - Bachelor's Degree in Industrial Engineering Technology

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject Type:** Optional

**Module:**

## 1. General information

### 1.1. Aims of the course

Subject linked to the subject with code 29641. For further information, please check the course description of the subject with code 29641.

## 2. 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 (20 % of grade)
- Laboratory work: pre-lab assignments, attitude, accomplishment during laboratory session, and lab reports (40 %)
- Personal work: students must complete a digital design application related to any industrial field (40 %)

## 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 (1.2 ECTS): 30 hours.

- Practice sessions (0.6 ECTS): 15 hours.
- Laboratory sessions (0.6 ECTS): 15 hours.
- Autonomous work and study (3.4 ECTS): 84 hours.
- Assessment (0.2 ECTS): 6 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.

*Practice sessions:* Lectures will be complemented by problem-solving sessions (1 weekly hour) .

*Autonomous work and study:* students are expected to spend about 80 hours to study theory, solve problems, and prepare the final exam, as well as, pre-lab assignments and lab reports and the final student work.

*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. Introduction.

Topic 2. Microcontrollers.

Topic 3. MSP430 Microcontroller Basics.

Topic 4. Designing Digital Circuits using VHDL.

Topic 5. Examples of digital design applied to industry.

Laboratory sessions

Session 1. Introduction to the desing with microcontrollers.

Session 2. Digital voltmeter design using an MSP430.

Session 3. Introduction to Digital Circuit Design using Xilinx ISE Tools.

Session 4. State machine implementation by VHDL.

Session 5. PWM generation to control a servo motor using an FPGA.

### 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 (<http://eina.unizar.es>).

### 4.5. Bibliography and recommended resources

Link: <http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30046>