30046 - Digital Electronic Systems

Información del Plan Docente

Academic Year	2017/18
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.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.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, attendance, attitude, accomplishment during laboratory session , and reports (50 %)

5.Methodology, learning tasks, syllabus and resources

5.1.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

5.2.Learning tasks

The course includes lectures, exercises and laboratory sessions. The theoretical basis of digital 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 check the operation of the digital electronic systems.

The course includes 6 ECTS organized according to:

- Lectures (1.8 ECTS): 45 hours.

- Laboratory sessions (0.6 ECTS): 15 hours.

- Guided assignments (1.0 ECTS): 25 hours.

- Autonomous work (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. The professor will proposed some exercises and cases for solving by students in class. 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 during 10 week) .

Guided assignments : students will complete assignments, problems and exercises related to concepts seen problem-solving sessions and lectures.

Autonomous work : students are expected to spend about 40 hours to study theory, solve problems, prepare works and oral presentation, and take exams.

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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.

5.3.Syllabus

The course will address the following topics:

Theory sessions

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. VHDL modeling of sequential digital circuits.

Session 3. Angular velocity measurement of a dc motor in real time with an FPGA.

Session 4. PWM generation to control a servo motor using an FPGA.

Session 5. Digital voltmeter design using an MSP430.

Session 6. Sine wave generator design using an MSP430.

5.4.Course planning and calendar

Lectures run for 3 weekly hours. Laboratory sessions will take place every 2 weeks (6 sessions in total) and last 2.5 hours each.

For further details concerning the timetable, classroom and further information regarding this course, please refer to the Escuela de Ingeniería y Arquitectura de la Universidad de Zaragoza (EINA), website, https://eina.unizar.es/ .

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5.5.Bibliography and recommended resources

All course materials are posted on Moodle.

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