29819 - Digital Electronics

Syllabus Information

Academic Year: 2019/20
Subject: 29819 - Digital Electronics
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
326 - Escuela Universitaria Politécnica de Teruel
Degree: 440 - Bachelor's Degree in Electronic and Automatic Engineering
           444 - Bachelor's Degree in Electronic and Automatic Engineering
ECTS: 6.0
Year: 2
Semester: Second semester
Subject Type: Compulsory
Module: ---

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)

IN ZARAGOZA

Course grading
The course is evaluated according to the following items:
- Mid-term exam (CP)
- Final exam (CE)
- Laboratory classes (CL)
The final grade (CG) is obtained using the following equations:
CGaux = 0.8xCT + 0.2xCL, where CT = max{0.2xCP + 0.6xCE, 0.8xCE}, then:
CG = CGaux if CL>4 and CT>4, otherwise CG = min{4, CGaux}

IN TERUEL
The course is graded following these rules:

COURSE PERIOD:
Laboratory sessions: (grade *CL* 0 to 10). It accounts for a 25% of the final grade. A minimum of 4 is required to pass the subject.

OFFICIAL CALL (EXAM PERIOD):

- **Written exam (theory and problems)**: grade *CT* 0 to 10 puntos. It accounts for the 75% of the final grade. A minimum of 4 is required to pass the subject.
- **Laboratory exam**: grade *CL* 0 to 10 puntos. It accounts for the 25% of the final grade. A minimum of 4 is required to pass the subject. This exam is compulsory only for those students who did not obtain a minimum of 4 in *CL* during the course period.

TOTAL GRADE: If the student has a grade of at least 4 in *CL* and *CT*, the final grade will be obtained from CL and CT with the weights indicated above. Otherwise, the student will fail and the grade will be obtained as the minimum of these two values: 4 and 0.75xCT+0.25xCL.

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the 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, exercises and problems, laboratory sessions, 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 the following learning tasks:

In EINA, Zaragoza:

The course includes 6 ECTS organized according to:

- Lectures (1.8 ECTS): 45 hours.

- Laboratory sessions (0.6 ECTS): 15 hours.

- Assignments (0.8 ECTS): 20 hours.

- Autonomous work and study (2.6 ECTS): 65 hours.

- Assessment (0.2 ECTS): 5 hours.

In EUPT, Teruel, the approximate distribution of course activities is:

Classroom activities: 2,4 ECTS (60 hours)

1) Course lectures (T1) (30 hours).

They will include theoretical concepts and practical applications.

2) Case studies (T2) (15 hours)

Different case studies will be worked out in 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).

Several laboratory sessions will be carried out in small groups.

Personal work: 3,6 ECTS (90 hours)

4) Assignments (T6) (20 hours)

This includes the preparation of laboratory sessions.

5) Personal study (T7) (65 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) (5 hours)

Assessment will be based on coursework (laboratory work) and final examination.

4.3.Syllabus

In EINA, Zaragoza:

The course will address the following topics:

Lectures

Topic 1. Fundamentals of Digital Electronics.

Topic 2. Combinational Logic Circuits.

Topic 3. Sequential Logic Circuits.

Topic 4. Technologies of Digital Circuits.

Laboratory sessions

Session 1. Fire-alarm circuit design.

Session 2. BCD to Seven-segment decoder design.

Session 3. Liquid level indicator circuit design.

Session 4. 2-digit BCD counter design using an FPGA.

Session 5. State-machine design using an FPGA.

Session 6. PWM generation to control a servo motor using an FPGA.

In EUP Teruel:

Syllabus:

- Fundamentals of logic systems
- Characteristics of digital circuits
- Combinational logic
- Introduction to VHDL
- Codification and error detection
- Latches and registers
- Programmable Logic Devices
- Sequential logic
- Counters and its applications

Laboratory sessions:

- Properties of CMOS circuits
- Combinational circuits in VHDL
- Monostable and stables with the 555
- Sequential circuits in VHDL
- Counters in VHDL (I)
- Counters in VHDL (II)
- Design of complex systems

4.4.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 EINA website (https://eina.unizar.es) in Zaragoza or EUPT in Teruel (https://eupt.unizar.es).

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=29819&year=2019