Universidad Zaragoza

29824 - Programmable Electronic Systems

Syllabus Information

Academic Year: 2021/22

Subject: 29824 - Programmable Electronic Systems

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

326 - Escuela Universitaria Politécnica de Teruel

Degree: 330 - Complementos de formación Máster/Doctorado

       440 - Bachelor's Degree in Electronic and Automatic Engineering

       444 - Bachelor's Degree in Electronic and Automatic Engineering

ECTS: 10.0

Year: 440 - Bachelor's Degree in Electronic and Automatic Engineering: 3

444 - Bachelor's Degree in Electronic and Automatic Engineering: 3

330 - Complementos de formación Máster/Doctorado: XX

Semester: Annual

Subject Type: 440 - Compulsory

330 - ENG/Complementos de Formación

444 - Compulsory

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The course is based on combining theoretical explanations with practical exercises and laboratory work. A wide range of teaching and learning tasks are implemented, such as:

- Lectures will provide theoretical background on the fundamentals of microcontroller system design and embedded systems
- Case studies and real applications will be worked out at the classroom
- The students will do laboratory work connecting different peripherals to a microcontroller evaluation board and will program the hardware in assembly and C languages
- Individual and group assignments will be proposed
- Student participation is considered very important in order to acquire the learning outcomes and skills needed
- At the Escuela Universitaria Politécnica de Teruel, the students will develop a course Project

4.2. Learning tasks

The course includes the following learning tasks:

Classroom activities 4 ECTS (100 hours)

1) Course lectures (T1) (50 hours).

Fundamentals of microcontroller system design, hardware, programming and embedded systems, mixing theoretical concepts and practical applications.

2) Case studies (T2) (25 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) Practical work (T3) (25 hours).

Five practical sessions will be carried out in the first semester, and four in the second one, consisting of hardware development and programming. Students have to prepare sessions in advance

Autonomous work: 6 ECTS (150 hours)

4) Assignments (T6) (50 hours)

Individual and group assignments will be proposed

5) Personal study (T7) (94 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) (6 hours)

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

4.3. Syllabus

The course will address the following topics:

I) Digital Electronic Systems

1. Architecture and blocks of a commercial microcontroller
2. Programming in Assembly and C
3. Inputs and Outputs
4. Peripherals and serial communications
5. Memory circuits and design of bus-oriented systems
6. Design of complex digital electronics systems: uP/uC/DSP/FPGA

II) Embedded Systems
1. C development tools for embedded systems
2. Time management and specialized peripherals
3. Programming of discrete control systems
4. Programming of sampled control systems
5. Concurrent applications. Cyclic executives
6. Real-time kernels and priorities

Note. A more detailed program will be provided at the beginning of the course.

4.4. Course planning and calendar

Timetables for classroom and practical sessions will be published prior to the beginning of the course on the web of the EINA https://eina.unizar.es/ and EUPT https://eupt.unizar.es/

A detailed course timetable is provided to the student at Moodle.

4.5. Bibliography and recommended resources

Course notes and other documentation:

https://moodle.unizar.es/add/