29824 - Programmable Electronic Systems

Syllabus Information

Academic Year: 2019/20
Subject: 29824 - Programmable Electronic Systems
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
330 - Complementos de formación Máster/Doctorado
ECTS: 10.0
Year: XX
Semester: 330 - Annual
440 - Annual
444 - Annual
Subject Type: 440 - Compulsory
444 - Compulsory
330 - ENG/Complementos de Formación
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)

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) Laboratory work (T3) (25 hours).

Five laboratory 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:

<ins>I) Digital Electronic Systems</ins>

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

<ins>II) Embedded Systems</ins>

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 laboratory 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 course timetable is also provided to the student, which includes a detailed description of the dates for submission https://moodle2.unizar.es/add/

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=29824&year=2019

Course notes (slides) in https://moodle2.unizar.es/add/