29844 - Real-Time Systems

Syllabus Information

Academic Year: 2021/22
Subject: 29844 - Real-Time Systems
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 440 - Bachelor's Degree in Electronic and Automatic Engineering
ECTS: 6.0
Year: 4
Semester: First semester
Subject Type: Optional
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 methodology followed in this course is oriented towards the achievement of the learning objectives. The course will be 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 and practical concepts of real-time systems, illustrated with examples. For these examples, a real-time kernel and a specific microcontroller will be used.

- Students will be organized by groups of two. Each group will develop a project.

4.2. Learning tasks

The course includes the following learning tasks:

Classroom activities: 2.4 ECTS (60 hours)

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

Lectures of theoretical and practical content. The theoretical and practical aspects of real-time systems are presented, illustrating them with examples. Student participation is considered very important in order to acquire the learning outcomes and skills needed.

2) Case studies (type T2) (15 hours).

Different case studies will be worked out in the classroom. Students are encouraged to prepare them in advance.

3) Lab (type T3) (15 hours).

Five sessions of three hours each in which the working groups will develop the assigned project with the teacher assistance.

Personal work: 3.6 ECTS (90 hours)

4) Project (T6 type) (40 hours).

Two-person course projects will be assigned.

5) Personal study (type T7) (46 hours).

Student Personal study of the theoretical issues and resolution of problems.

6) Evaluation (T8) (4 hours).

Evaluation is also a learning tool with which the student checks the degree of understanding and assimilation reached. Assessment will be based on the project assignment and a final examination.

4.3. Syllabus

The course will address the following topics:

1. Real-time systems introduction.
2. The microcontroller F2812
3. Concurrency in applications. Priorities and time.
4. Real-time kernels. Structure, tasks and time. SYS-BIOS.
5. Deadline Monotonic Scheduling.
6. Resource sharing between tasks.
7. Priority inheritance and priority ceiling protocols.
8. Aperiodic tasks.
9. Fault Tolerance.

4.4. Course planning and calendar

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