60945 - Electronic sensor networks

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	533 - Master's Degree in Telecommunications Engineering
ECTS	5.0
Course	2
Period	First semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The teaching process will involve three main levels: lectures, laboratory and project development, with increasing student participation.

- In the lectures the theoretical basis of sensor networks in ambient intelligence applications will be presented.
- In laboratory practices, small groups of students, will develop representative problems, designs and practical assemblies with sensor networks.
- In the project the student will be responsible for developing the work and the teacher will tutorize the work

60945 - Electronic sensor networks

5.2.Learning activities

Classroom activities (1.96 ECTS, 49 hours):
A01 Lecture (10 hours): In this activity the fundamental contents of the subject will be presented and a set of representative problems will be made. This activity will take place in the classroom in person. The materials will be presented in the lectures will be available to students through the Digital Teaching Ring.
A03 Labs (30 hours): The practices are structured in 9 tasks. The detail of the practices will be available to students in the Digital Teaching Ring.
A06 Tutela of work (15 hours): Tutela personalized teacher-student teachers work.
A08 Assessment tests (4 hours): The evaluation activity includes the examination and review of test scores and work.
Non-presence activities (3.04 ECTS, 76 hours)
A06 teachers work (50 hours): This activity related work practices will be held. Work will be done in groups of two.
A07 study (26 hours): This activity includes both personal study aimed at achieving adequate monitoring of the subject, conducting practices, exam preparation and tutoring.

5.3.Program

Theory:

1. Introduction to sensor networks. Applications.
2. Communication protocols in sensor networks. Synchronization. Interoperability.
3. RF nodes design, energy considerations.
4. Embedded intelligence and performance metrics

Laboratory:

1. Microcontroller:

Task 1: Understanding the environment - Basic I/O, Timing, UART and ADC
Task 2: Interrupts, PWM and RTCC (Real Time Clock Calendar)
Task 3: Reat time operating system. FreeRTOS

2. WIFI:

Task 4: WiFi networking, Exchange TCP data
Task 5: HTTP send and receive data
Task 6: AJAX
Task 7: Low Power

3. ZigBee:

Task 8: Zigbee Networking
Task 9: Zigbee + WIFI

5.4.Planning and scheduling

Lectures, problem classes and practice sessions are held in the laboratory according to schedule set by thecenter (schedules available on the website). The other activities will be planned depending on the number of students and will be announced in good time.

5.5.Bibliography and recomended resources

60945 - Electronic sensor networks

They will be available in http://moodle2.unizar.es:

- Transparencies of the subject
- Scripts practices.
- Supplementary teaching materials: a set of useful materials for the course: catalogs of manufacturers, component data sheets, manuals laboratory instrumentation, etc.