



Guía docente

300100 - STCIOT - Arquitecturas de Iot Sostenibles

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Unidad responsable: Escuela de Ingeniería de Telecomunicación y Aeroespacial de Castelldefels
Unidad que imparte: **Titulación:** MÁSTER UNIVERSITARIO EN INTELIGENCIA ARTIFICIAL PARA INDUSTRIAS CONECTADAS (AI4CI) (Plan 2025). (Asignatura optativa).

Curso: 2025 **Créditos ECTS:** 3.0 **Idiomas:** Inglés

PROFESORADO

Profesorado responsable: Camen Delgado (i2Cat)

Otros:

CAPACIDADES PREVIAS

- Basics of programming. Knowledge of Matlab.
- Basics of Electronics and Circuit Theory.
- Basics of Mathematical Analysis

METODOLOGÍAS DOCENTES

Lectures during one week (5h-6h per day) + autonomous project

OBJETIVOS DE APRENDIZAJE DE LA ASIGNATURA

The main goal of this course is to understand the need of batteryless IoT devices and what are the new challenges of these intermittent systems. Other general aspects of IoT such as low power communication technologies or applications (including sustainable applications) will also be covered.

HORAS TOTALES DE DEDICACIÓN DEL ESTUDIANTADO

Tipo	Horas	Porcentaje
Horas grupo grande	27,0	36.00
Horas aprendizaje autónomo	48,0	64.00

Dedicación total: 75 h



CONTENIDOS

Sustainable IoT Architectures

Descripción:

This Short Term Course will focus on sustainable batteryless IoT devices. In general, IoT devices run on batteries, which are short-lived, harmful to the environment and difficult to replace in hard-to-reach areas. For this reason, batteryless devices get rid of batteries by using energy harvested from the environment and storing it in a small capacitor. However, capacitors have to deal with an intermittency behaviour which results in communication and computing challenges, which will be explained in this course. We will evaluate how different technologies such as Bluetooth Low Energy (BLE) or LoRaWAN deal with this new paradigm and what are the new takeaways.

Topics:

- Introduction to IoT
- Sensors, Actuators and Applications
- IoT Communication Technologies
- Batteryless IoT devices
- Circuit modeling
- Energy harvesting possibilities
- Batteryless Communication Challenges
- Batteryless Computing Challenges
- Conclusions

Dedicación: 75h

Grupo grande/Teoría: 27h

Aprendizaje autónomo: 48h

SISTEMA DE CALIFICACIÓN

Final exam, short in-class quizzes and lab project report.

A project assignment to perform after the STC execution will also be evaluated.