

# USEES5 - Sustainable IoT Architectures

## Présentation

### Prérequis

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

### Objectifs pédagogiques

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.

## Programme

### Contenu

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

### Modalités de validation

- Contrôle continu
- Projet(s)
- Examen final

### Description des modalités de validation

- Final exam, short in-class quizzes and lab project report.
- A project assignment to perform after the STC execution will also be evaluated.

Mis à jour le 24-02-2025



**Code : USEES5**

Unité spécifique de type cours

3 crédits

**Responsabilité nationale :**

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