# USEEK9 - Internet of things

Mis à jour le 10-04-2020

**Code : USEEK9**

Unité spécifique de type cours

2 crédits

**Responsabilité nationale :**
EPN03 - Electroniques, électrotechnique, automatique et mesure (EEAM) / 1

**Contact national :**

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## Présentation

### Prérequis

Basics notions of network and Telecommunications

### Objectifs pédagogiques

This course is an entry level introduction to the concept of Internet of Things, its applications and the associated constraints for their implementation. It will first gives an introduction to the system architecture and applications. Then it provides students with the knowledge of communication technologies allowing data exchanges. Finally, it provides basics of machine learning algorithms to handle the large amount of data related to IoT.

It will allow us to get knowledge about classical communication networks (Bluetooth, ZigBee, wifi direct) and on the Long Range communications principles dedicated to Internet of things (LoRa, Sigfox, NBIoT).

### Compétences

- Built an electronic system embedded smart sensors/actionor
- To make the link with the 2nd year digital communications courses et 3rd year radiocommunications courses integrating the concepts of signal to noise ratio, signal to interference ratio.
- To build applications monitoring connected objects on service platforms

To do simple processing on data at the output of the different sensors and implementing decision rules.

## Programme

### Contenu

- Introduction to IoT
  - definitions and terminology,
  - applications,
  - architectures and infrastructures of an IoT system.
- Communications techniques for sensors networks
  - principles and techniques,
  - architecture,
  - antennas and propagation.
- Long Range communication techniques
  - principles and techniques,
  - architecture,
  - antennas and propagation.
- Security and confidentiality in IoT
  - Challenges and basic principles
  - Algorithms and dedicated protocols
- Introduction to machine learning techniques for data processing
  - Classification,
  - Regression,
- Localisation in IoT context
  - Motivations
  - Localization algorithms

### Modalités de validation

- Projet(s)

- Examen final

## Description des modalités de validation

Exam and practical works  (projects forms)