

# IoT Labs: Projects Proposal

## 1. Global Outcomes

- Analyze the constraints of an LPWAN based on LoRaWAN
- Deploy an end-to-end IoT service over LoRaWAN
- Design the different components of an end-to-end IoT chain
  - Physical interface of an IoT device
  - Control and actuation
  - Data storage, visualization, and analytics

## 2. Requirements and Constraints

- Use the ESIB LoRaWAN platform
- Provide working code and proof of concepts
- Provide technical documentation

## 3. [CO] Connecting the Platform

- Describe and analyze the basic steps for sending and receiving data over LoRaWAN: [IoT Labs: Exploring LoRaWAN](#)

## 4. [PO] Projects Proposal

### 4.1 LoRaGreen: Smart Classroom

- Design and implement an end-to-end IoT service
  - Detect, transmit, store, and visualize
    - Classroom occupancy
    - Classroom lighting and temperature
- Analyze and correlate occupancy and lighting

### 4.2 LoRaMarathon: Live GPS Tracking

- Design and implement an end-to-end IoT service
  - Detect, transmit, store, and visualize
    - GPS position of device
    - RSSI level
- Track device on a dynamic map

## 4.3 LoRaBot: Device Configuration via Messenger

- Design and implement an end-to-end IoT service
  - Tune radio parameters (SF, transmit period, sleep, etc.)
- Use a messenger robot to interact with device

## 4.4 LoRaPark: Parking Counters

- Detect, transmit, store, and visualize
  - Car entrance and exit of parking
- Make data available on a messenger robot

## 5. Available Resources

- Devices
  - Arduino Mega with LoRa Dragino Shields
  - Raspberry Pi with LoRa and GPS shield ( [GPS shield](#), [LoRa on Raspberry Pi](#))
- Sensors: Temperature, light, Infrared ( [PIR](#)), moisture
- Scripts
  - MQTT python examples
- Visualisation
  - [emoncms](#)

## 6. Assessment and Grading

- Assessment
  - 1 Common outcome
  - 1 Personal outcome
- Technical tutorial on Wiki
- Oral presentation of achievements
  - Accomplished
  - Exceeded

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