

**Module number: M4****Name of the module: Internet of Things and Cloud Technology****Responsible: P13-KMITL (P8 to P13)**

ID	Didactic modules (Teaching materials)	Comments	THEO (D3.4)	PRAC (D3.5)	THEO hours	PRAC hours	Total of Hours	LEADER	Contributor	Interested
M4	IoT and cloud technology	MQTT, REST API, Proficloud, Google Cloud	11	10				P13-KMITL	P8 to P13	

Total number of hours: 21h (Theory: 11h, Practice: 10h)**Aims:**

The goal of the module is to give theoretical and practical information about principle of Internet of things, principle of MQTT or others IoT related protocols, introduction to sensor, programming to connect smart equipment on various platforms, learning about PLC, Arduino, or Raspberry Pi etc., programming on data displaying and data transmission. Cloud-based IoT platforms, Proficloud, Google Cloud, and case studies. The students also will have a chance about IoT device programming to connect smart equipments with the ETAT Smart Lab on real, simulation, or process simulation on smart city and smart home or related topics.

Programme:Lecture:

- Principle of Internet of things (1 h)
- Principle of MQTT and IoT related protocols (2 h)
- REST architectural (1 h)
- Introduction to sensor (1 h)
- Data transmission using MQTT or other related protocols (1 h)
- Connecting smart equipment on various platforms (1 h)
- Cloud-based IoT platforms (1 h)
- Proficloud, Google Cloud and case studies (1 h)
- IoT Technologies and Applications (2 h)

Practice:

- PLC configuration (1 h)
- Connecting sensors (1 h)
- IoT device programming (Arduino and Raspberry Pi) (2 h)
- Proficloud and Google Cloud (1 h)
- Programming on data displaying and data transmission (2 h)
- Programming to connect smart equipment on various platforms (2 h)
- Exercises and case studies (1 h)

Assessment method: Tests, Results of the practice work

Prerequisites:

- Programming fundamentals
- Overview of Sensors working

Expected Learning Outcomes (ELOs):

- 1) Understand key concepts of Internet of Things and protocols
 - 2) Understand principles of PLC, Arduino, Raspberry Pi, sensors and other related equipment
 - 3) Understand how to connect smart equipments on various platforms
 - 4) Consider appropriate solutions and models for implementing on cloud computing platforms
 - 5) Recognize case studies of IoT in commercial or industrial applications
 - 6) Identify current trends in IoT, including the evolution of IoT components
-