

# Internet of Things

## General Information

### Number of ECTS Credits

3

### Module code

TSM\_IoT

### Valid for academic year

2020-2021

### Last modification

2019-08-31

### Responsible of module

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### Explanations regarding the language definitions for each location:

- Instruction is given in the language defined below for each location/each time the module is held.
- Documentation is available in the languages defined below. Where documents are in several languages, the percentage distribution is shown (100% = all the documentation).
- The examination is available 100% in the languages shown for each location/each time it is held.

	Berne	Lausanne	Lugano	Zurich
<b>Instruction</b>			X E 100%	
<b>Documentation</b>			X E 100%	
<b>Examination</b>			X E 100%	

### Module Category

TSM Technical scientific module

### Lessons

2 lecture periods and 1 tutorial period per week

## Entry level competences

### Prerequisites, previous knowledge

Familiarity with networking and TCP/IP

Basic knowledge in Python, HTML and JavaScript

## Brief course description of module objectives and content

This course covers all the topics related to the Internet of Things: from the sensors level to the higher layer of data representation and manipulation. It is intended to give the student the technical knowledge and skills needed for building up an Internet of Things (IoT) system.

## Aims, content, methods

### Learning objectives and acquired competencies

Students attending this module

- have an overview of the IoT world: the technologies, application contexts, development strategies, implementation problems, and the possible solutions
- gain familiarity with the key technologies and protocols employed at each layer of the stack
- learn how to plan and implement real-world applications that involve heterogeneous devices
- Understand where the IoT concept fits within the broader ICT industry and possible future trends
- Appreciate the role of big data, cloud computing and data analytics in a typical IoT system

### Contents of module with emphasis on teaching content

Part 1 (25%):

- Introduction to the Internet of Things
- Edge and gateway devices (microcontroller, sensors, and actuators)
- Communication technologies
- Communication protocols

Part 2 (30%):

- Embedded programming (Arduino, RaspberryPi)
- Deploy an IoT infrastructure

Part 3 (30%):

- Heterogeneous IoT devices integration
- Data acquisition, management, and mining
- IoT in the real world

Part 4 (15%):

- Connect the IoT infrastructure with the data world

### Teaching and learning methods

Lecture and practical work on computer and dedicated hardware

### Literature

## Assessment

### Certification requirements

Module does not use certification requirements

### Basic principle for exams

**As a rule, all the standard final exams for modules and also all repetition exams are to be in written form**

### Standard final exam for a module and written repetition exam

Kind of exam

written

Duration of exam

120 minutes

Permissible aids

*Aids permitted as specified below:*

Permissible electronic aids

No electronic aids permitted

Other permissible aids

Slides and lecture notes in addition to recommended book chapters

**Special case: Repetition exam as oral exam**

**Kind of exam**

oral

**Duration of exam**

30 minutes

**Permissible aids**

No aids permitted