Microcontrollers and their environment

In brief

Course langage: French

Presentation

Learning objectives

The objective of this option is to introduce you to and familiarise you with the operation and use of microcontrollers, which have now become essential electronic components in electronic and automated systems, particularly embedded systems.
The aim is to understand a complex system of sensors and actuators for the Internet of Things (IoT).

Description of the programme

You will understand the architecture of a microcontroller system and be able to write a program in assembly or advanced language to implement a microcontroller.
You will understand the different functions such as signal acquisition, creation of analog signals for system control, signal transmission under different protocols, ... in various applications such as robotics, control of automated systems, home automation, automotive, aeronautics, ...
We will explain how to drive a microcontroller within your real electronic systems such as in robotics, control of acquisition system, 3D printer, automatisms. We will link this course to all the other courses of the training and really implement a signal acquisition and system control.
To be really complete, the course will include a part on the design of microcontrollers and the different technologies used to create them.
The option will be articulated around courses, and essentially practical applications of design and control of cards on subjects that you can choose and which can come from your associative or personal projects.
You will carry out the programming of an embedded system on a kit that you will choose based on Arduino, Raspberry components...

At the end of the course you will be able to describe, understand, choose and program a microcontroller hardware and implement it within a system and a specific application.

Generic central skills and knowledge targeted in the discipline

Create value through scientific and technical innovation through the innovations used in IoT and embedded and communicating electronics.
Mastering the complexity of systems through the electronic system that responds to a complex problem.
Leading programs by managing the series of TP/project sessions.
Manage ethically and responsibly by responding to a problem with an electronic system that makes ethical and responsible sense.

How knowledge is tested

Evaluation of the model produced, its functioning, the programming and the method used.

Bibliography

Course slideshows
Component documents e.g. arduino, Raspberry

Teaching team

Thierry GAIDON
Caroline FOSSATI

Sustainable Development Goal

Affordable and clean energy

Sustainable cities and communities

Responsible consumption and production

Climate action

Total des heures		**30h**
CM	Master class	14h
TD	Directed work	8h
TP	Practical work	8h

Useful info

Name responsible for EU

Lead Instructor

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