

**Internet****Techniques et protocoles de communication**

Internet est de plus en plus omniprésent; il est maintenant inévitable dans les systèmes embarqués.

You can see detailed course descriptions of the various trainings by using the above navigation bar. You can also click on course identifiers in the following course briefs hereafter.

IOT1 - Internet of Things (IOT) on Microcontrollers Building low-power IOT devices using standard microcontrollers
This course introduce the IoT ecosystem, describe the most used IoT Edge to Cloud Protocols (MQTT, MQTT-SN and CoAP), explore particularly heinous IoT focused attacks and security provisions at each level of stack (physical devices, communication systems and networks) . This course explains how to configure the LwIP (with MQTT), FreeRTOS and MbedTLS for a microcontroller-based IoT application; it requires previous knowledge of FreeRTOS.

N1 - Ethernet and switching This course covers both IEEE802.3 (10, 100, 1000 Mbps) and IEEE802.1D/802.1Q

N2 - IEEE1588 - Precise Time Protocol This course describes the PTP protocol and provides implementation examples

N3 - Ethernet 10 Gigabit This course covers IEEE802.3 Ethernet 10 gigabit and SFP+

STG - STM32 + FreeRTOS + LwIP This course covers the STM32 ARM-based MCU family, the FreeRTOS Real Time OS, the LWIP TCP/IP Stack and/or the EmWin GUI Stack

STS1 - LwIP Implementation This course explains the implementation of the LwIP stack on STM32 MCUs