formation continue Unil EPFL

www.formation-continue-unil-epfl.ch

3-day course

Internet of Things (IoT)

Smart connected technologies : latest trends, challenges and opportunities

September 3 to 5, 2018

Target audience

Engineers seeking a comprehensive introduction or update in IoT technologies and applications.

Requirements

- A basic knowledge in embedded systems design, in microcontrollers programming, in signal processing and in communication concepts. Light programming skills.

The course will be given in English.

Dates and schedule

- Monday, September 3, 2018
- Tuesday, September 4, 2018
- Wednesday, September 5, 2018

from 9 am to 6 pm

Certification

A certificate of attendance will be delivered at the end of the course.

Course venue

EPFL, Lausanne, Switzerland

Organization

- Embedded Systems Laboratory (ESL), Institute of Electrical Engineering, Ecole Polytechnique Fédérale de Lausanne (EPFL)

Overview

Technological advances in miniaturized, ultra-low power embedded systems, in communication protocols and in data mining techniques are leading to disruptive innovations. Smart cities, eHealth or Industry 4.0 – Internet of Things (IoT) environments have already started to deeply modify established industries. Nowadays, every organization should seriously think about how to embrace the opportunities and challenges offered by smart connected technologies.

This 3-day course will cover three main themes : Smart platforms for edge computing in cloud-based IoT (hardware and software designs, power/energy requirements), Communication for IoT (protocols, networks, latest standards) and secure IoT applications (examples of Industry 4.0 and wearable IoT devices), including practical case studies of data collection and data analysis exercises.

Objectives

- Get a comprehensive overview of IoT terminology, concepts and latest trends
- Learn about the most up-to-date developments in ultra-low power IoT systems including platform designs and management of energy needs
- Understand main challenges related to communication in different IoT setups
- Discover examples and case studies of application-oriented IoT designs (in medical, wellness, smart homes or Industry 4.0 applications)
- Experiments on data collection and analysis techniques using different IoT systems

Internet of Things (IoT)

Register on **www.formation-continue-unil-epfl.ch**

Course fee

1900.- Swiss Francs
(includes course material, lunches and refreshments)

10% special discount for contributing members of EPFL Alumni

Registration deadline

June 8, 2018

Program Director

- **Prof. David Atienza Alonso,** *Associate Professor of Electrical & Computer Engineering and Head of Embedded Systems Laboratory (ESL), EPFL*

Instructors

- **Prof. David Atienza Alonso,** *Associate Professor of Electrical & Computer Engineering and Head of Embedded Systems Laboratory (ESL), EPFL*
- **Prof. Andreas Burg,** *Assistant Professor and Head of Telecommunications Circuits Laboratory (TCL), EPFL*
- **Mr. Marco Magatti,** *Head of New Product Innovation and Design, Nespresso SA*
- **Dr. Martino Ruggiero,** *Product Development Manager, Nespresso SA*

formation continue Unil EPFL

Program

DAY 1 : SMART PLATFORMS FOR IoT

- **IoT terminology and concepts :** Computing error rates, black out time, etc. / *Case studies : Wearables (Shimmer, Apple Watch) and Industry 4.0 (AWS Zero Touch Kit)*
- **IoT platform designs :** Microprocessor-based designs, memory and energy considerations / *Case studies : TI Sensor Tag; Shimmer WBSN; Apple Watch, AWS IoT*
- **IoT nodes - Power harvesting and management :** Energy requirements, hardware designs latest developments / *Case studies : TI Sensor Tag, ST Jennic*

DAY 2 : COMMUNICATION FOR IoT

- **Basics :** Latest trends and concepts in transmission schemes and protocols standards / *Case studies : IEEE 802.15.4 (ULP IoT), 802.15.6 (Body Area Netw.), LoRA, SigFox, etc.*
- **Wireless communication stack :** Basic physical layer, medium-access and network layer aspects / *Case studies : IEEE Zigbee and BT Low-Energy; ST NFC for IoT; Emerging M2M : NB-LTE, EC-GSM, NB-CIoT, LoRa, Sigfox*
- **Communication modeling for IoT topology exploration :** *Case studies : Energy, performance and power comparisons between WiFi, WiFi LP, Bluetooth/LE, Zigbee, Z-Wave & En-Ocean*

DAY 3 : APPLICATION-ORIENTED IoT DESIGNS

- **User interfaces vs. user experience in IoT products :** Exploration of IoT characteristics to match market needs, lessons learnt from IoT product success stories / *Case studies : Smart Home Appliances, Smart Car Context and Reebok Wearable devices*
- **Secure IoT sensors :** Security goals and design of networks for IoT devices, building safe IoT platforms with cloud services / *Case studies : SSL/TLS general architecture for IoT devices in smart home and Industry 4.0*
- **Interaction of IoT devices and cloud services :** Google Cloud Platform and Amazon Web Services (AWS) / *Case studies : AWS cloud secure data transmission and analysis*

Formation Continue UNIL-EPFL
EPFL Innovation Park, Bâtiment E
CH -1015 Lausanne, Switzerland
Tel.: +41 21 693 71 20 - Fax : +41 21 693 71 30
formcont@unil.ch - www.formation-continue-unil-epfl.ch