Publication date : 01/26/2024

Course : Embedded systems, development on the Arduino platform

Practical course - 4d - 28h00 - Ref. ARD
Price : 2550 € E.T.

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This training course will enable you to create new products using the Arduino electronics kit. In particular, you'll learn how to set up the development environment, the architecture of ATmega microcontrollers and the various interrupt, timer and communication interface techniques.

Teaching objectives

At the end of the training, the participant will be able to:

- Understand the architecture of ATmega family microcontrollers
- Implementing a development environment
- Input-output management
- Handling interruptions
- Managing communications

Intended audience

Computer scientists wishing to develop applications using Arduino technology.

Prerequisites

Good knowledge of C language. Knowledge of electronic logic desirable.

Practical details

Hands-on work

You will carry out developments in C and C++ based on an Arduino kit that you will be able to take away with you at the end of the course.

Course schedule

PARTICIPANTS

Computer scientists wishing to develop applications using Arduino technology.

PREREQUISITES

Good knowledge of C language. Knowledge of electronic logic desirable.

TRAINER QUALIFICATIONS

The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

ASSESSMENT TERMS

The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more.
Participants also complete a placement test before and after the course to measure the skills they've developed.

1 Presentation

- Open Source in electronics.
- Arduino and Wiring projects.
- Arduino kits and shields (extension boards...).

Hands-on work

Get to grips with the Arduino environment (electronics kit, test board, components, etc.).

2 ATmega 328 family

- Overview of logic electronics.
- ATmega microcontroller family.
- ATmega architecture: memory model, I/O...
- Interrupt management.
- Power consumption management.

Hands-on work

Read simple electronic schematics, simulate logic operators.

3 Development tools

- The Arduino integrated development environment.
- Atmel Studio 6 IDE.
- Arduino libraries.
- The compilation chain.

Hands-on work

Set up development environments. Write an initial example, then load the executable onto the kit for execution.

4 Input-output

- Logic levels of digital inputs/outputs.
- TOR inputs/outputs.
- Analog-to-digital conversion: sampling principle.
- Analog-to-digital conversion on Arduino.
- Pulse Width Modulation (PWM) channels.
- Use of a PWM channel to create an analog signal.

Hands-on work

Use a PWM channel to create an analog signal. Create a digital I/O management application.

5 Interruptions

- Hardware and software interruptions, internal and external. Interruption vectors.
- Timers: reference clock, counters.
- Timer and PWM.

Hands-on work

Creation of an interrupt management application.

TEACHING AIDS AND TECHNICAL RESOURCES

• The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
• At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
• A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

TERMS AND DEADLINES

Registration must be completed 24 hours before the start of the training.

ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at psh-accueil@orsys.fr to review your request and its feasibility.

6 Communications

- Synchronous and asynchronous serial interfaces.
- Serial link, I2C and SPI bus.

Hands-on work
Create a serial link application.

7 Supplements

- Principle and loading of the Arduino bootloader.
- Create your own maps and shields.
- Assembly language.

Hands-on work
Create an application in C language and use assembler.

Dates and locations

PARIS LA DÉFENSE
2026 : 23 June, 3 Nov.