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Course : Raspberry Pi, create your own embedded system under Linux

Practical course - 3d - 21h00 - Ref. RBI
Price : 2470 CHF E.T.

★★★★★ 5 / 5

The Raspberry Pi is an excellent platform for discovering embedded Linux, offering numerous I/O interfaces at a relatively low cost. You'll learn how to master this system to easily develop your own embedded project (home automation, media player, robotics, connected object...).

Teaching objectives

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

- Getting to grips with the Raspberry Pi to install a standard distribution.
- Adjust and configure the system to your specific needs.
- Communicate using I/O interfaces such as RS-232, SPI, I²C, GPIO...
- Develop custom applications for embedded Linux.
- Recompile the system kernel and add additional drivers.

Intended audience

Technicians, project managers.

Prerequisites

Previous knowledge of Linux, at user level, is an advantage.

Practical details

Hands-on work

Hands-on practice on a Raspberry Pi kit that you can take away with you at the end of the course.

Course schedule

PARTICIPANTS

Technicians, project managers.

PREREQUISITES

Previous knowledge of Linux, at user level, is an advantage.

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.

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.

1 Getting started with the Raspberry Pi

- Introduction: presentation of the Raspberry Pi, the BCM2835/2836/2837 systems-on-chip and the Arm 1176 processor.
- Linux distribution for Raspberry Pi: download, install, test.
- Discover distribution: essential parameters, standard tools.
- Basic operation: system configuration, users, graphical user interface.
- Using Linux on the Raspberry Pi: advantages and disadvantages of an SD card-based system.

Hands-on work

Installing and testing a standard distribution on Raspberry Pi.

2 Configuration and customization

- Network: network configuration (Ethernet+WiFi), Internet, remote connection.
- Network services: starting up services, choosing the right ones for an embedded system.
- Update: package installation, update.
- Servers: configuring a Web server on the Raspberry Pi.
- Remote control: remote display and remote control.

Hands-on work

Optimal configuration of system, network and services.

3 I/O and communication interfaces

- RS-232 interface: communication between Raspberry Pi and PC. Boot traces.
- GPIO I/O: use from the Shell, in a Python or C program.
- Interrupts and GPIOs: detection of GPIO state changes.
- SPI: SPI dialog with a microcontroller.
- I^2C: $I^2$2 interrogation of a temperature sensor.
- Bluetooth: identification, connection, communication.

Hands-on work

Communication via various I/O interfaces.

4 Application programming on Raspberry Pi

- Programming in C/C++: native or cross-compilation, debugging, examples.
- Python programming: Python interpreter and modules. Graphical applications.
- Shell scripts: sample scripts for system initialization or application launch.

Hands-on work

Programming examples in different languages.

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.

5 Advanced customization

- Kernel recompilation: benefits of recompilation, adjusted configuration.
- Additional drivers: compilation and installation of external drivers.
- Configuration "from scratch": Build a fully customized system with Buildroot.

Hands-on work

Additional drivers (GPIO extension).