

# Course : Android, building your own embedded system

*Practical course - 4d - 28h00 - Ref. AEM*  
*Price : 2990 CHF E.T.*

This course will teach you how to develop an Android-based embedded system. You will implement the compilation chain to build an Android kernel adapted to your own hardware. You'll also see how to add peripherals and customize the file system.

## Teaching objectives

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

- ✓ Understanding the inner workings of Android
- ✓ Implementing the Android manufacturing system
- ✓ Adapting Android to specific hardware
- ✓ Adding devices to an existing Android

## Intended audience

Architects, developers.

## Prerequisites

Good knowledge of C and Linux or knowledge equivalent to that provided by the courses "Industrial, real-time and embedded Linux" (ref. LXT) and "BSP UBoot and embedded Linux" (ref. BLE).

## Practical details

### Hands-on work

Porting Android to specific hardware.

### Teaching methods

Presentation followed by practical exercises.

## Course schedule

### 1 Introduction to Android

- Historical background.
- The various players - Google, Linaro...
- Android architecture overview.

### PARTICIPANTS

Architects, developers.

### PREREQUISITES

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### 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.

## 2 The Android manufacturing system (BUILD)

- Using GIT to access Android sources.
- Compiler tools and Android emulator.
- Use of the BUILD system and production of a first image.

### Hands-on work

Use of the compiler chain and emulator.

## 3 The Linux kernel for Android

- Background on the Linux kernel and its development.
- Licenses: GPL, Linux, Android, third-party.
- Kernel configuration and compilation.
- The benefits of Android.
- Android boot, Android boot specifications.

### Hands-on work

Configure and build an Android kernel, boot on the emulator.

## 4 Debugging tools

- ADB: a debugger with a wealth of features.
- Use of logs, remote command execution.
- Back to the Android file system.
- Access to the various components.

### Hands-on work

Use ADB to manage logs and transfer files.

## 5 Adding a device

- Adding a device to the Android manufacturing system.
- Architecture of makefiles and configuration files.
- Compilation steps.
- Get to grips with Android, modify system information, build ID, info and boot screens.

### Hands-on work

Add a device to Android, modify system information and boot screen.

## 6 Rootfs and applications

- Android file system structure.
- Overview of standard Android services.
- Supplier structure "service/content".
- Use of a JNI (Java Native Interface) and a library to access hardware components.

### Hands-on work

Customization of the Android file system, implementation of a Java interface and a simple library for accessing a device.

### 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](mailto:psh-accueil@orsys.fr) to review your request and its feasibility.

## 7 Android applications and packages

- Android application packaging, apk.
- Access to services from applications.
- Application life cycle.

### Hands-on work

Package an application that accesses a device via the previous JNI interface.