

EMBD33000-14-ILT (v1.0)

Course Specification

Course Description

Advanced Features and Techniques of Embedded Systems Design provides embedded systems developers the necessary skills to develop complex embedded systems and enables them to improve their designs by using the tools available in the Embedded Development Kit (EDK). This course also helps developers understand and utilize advanced components of embedded systems design for architecting a complex system in the Zynq™ All Programmable System on a Chip (SoC) or Microblaze™ soft processor. This course builds on the skills gained in the *Embedded Systems Design* course. Labs provide hands-on experience with developing, debugging, and simulating an embedded system. Utilizing memory resources and implementing high-performance DMA are also covered. Labs use demo boards in which designs are downloaded and verified.

Level – Embedded Hardware 4

Course Duration – 2 days

Price – \$1200 or 12 Xilinx Training Credits

Course Part Number – EMBD33000-14-ILT

Who Should Attend? – Hardware, firmware, and system design engineers who are interested in Xilinx embedded systems development flow

Prerequisites

- *Embedded Systems Development* course or experience with embedded systems design and Xilinx EDK tools
- Basic C programming
- Working knowledge of the Zynq All Programmable SoC or Microblaze processor

Software Tools

- Xilinx ISE® Design Suite: Embedded or System Edition 14.2

Hardware

- Architecture: Zynq-7000 All Programmable SoC and 7 series FPGAs*
- Demo board: Zynq-7000 All Programmable SoC ZC702 or Zed or Kintex™-7 FPGA KC705 board*

* This course focuses on the Zynq-7000 All Programmable SoC and 7 series FPGA architectures. Check with your local Authorized Training Provider for the specifics of the in-class lab board or other customizations.

After completing this comprehensive training, you will have the necessary skills to:

- Assemble an advanced embedded system
- Take advantage of the various features of the Zynq All Programmable SoC and Spartan® FPGAs, Cortex™-A9 and MicroBlaze™ processors, including the AXI interconnect, and the various memory controllers
- Apply advanced debugging techniques, including the use of the ChipScope™ tool for debugging an embedded system and HDL system simulation of processor-based designs
- Identify the steps involved in integrating a memory controller into an embedded system using the Cortex-A9 and MicroBlaze processors
- Integrate an interrupt controller and interrupt handler into an embedded design
- Design a flash memory-based system and boot load from off-chip Flash memory
- Perform HDL-based system simulation

Course Outline

Day 1

- Embedded Systems Development Review
- **Lab 1:** Building a Complete Embedded System
- Zynq All Programmable SoC Processing System Overview
- Debugging Using the ChipScope Pro Analyzer
- **Lab 2:** Debugging Using the ChipScope Pro Analyzer

- Block RAM and Memory Controllers
- External Memory Controllers for Static Memory
- Memory Controllers for Dynamic RAM
- **Lab 3:** Extending Memory Resources

Day 2

- Interrupts
- AXI Streaming Interface
- System Data Movement: Low Latency and High Bandwidth
- Advanced Processor and Peripheral Interface Options
- **Lab 4:** High-Performance DMA
- Advanced Processor Configurations
- Software Boot and PL Configuration
- **Lab 5:** Boot Loading from Flash Memory
- HDL System Simulation with an Embedded Processor
- **Lab 6:** Simulating an Embedded Processing System

Lab Descriptions

- **Lab 1:** Building a Complete Embedded System – Develop hardware that incorporates IP cores to interface to push buttons, a rotary switch, LEDs, an LCD display, and serial communication. Use the SDK development tools to create an embedded software application project for the hardware built.
- **Lab 2:** Debugging Using the ChipScope Pro Analyzer – Perform simultaneous hardware and software debugging with the ChipScope™ Pro Analyzer, SDK Debug perspective (GDB), and XMD.
- **Lab 3:** Extending Memory Resources – Use XPS to extend the memory resources for the Cortex-A9 or Microblaze processors.
- **Lab 4:** High-Performance DMA – Apply advanced PL design techniques for adding and connecting custom peripherals that access DDRx memory.
- **Lab 5:** Boot Loading from Flash Memory – Develop an application that is stored in flash memory, load it through a boot loader program, and execute a software application from external memory.
- **Lab 6:** Simulating an Embedded Processing System – Set up and perform HDL-based simulation on a design that contains an embedded processor system. Explore the tool flow for performing embedded processing simulation, including hardware co-simulation.

Register Today

To register for this course or to see a list of currently scheduled classes, please visit our secure [Online Store](#).

To request a public or private class, inquire about course offerings, or any other specific Xilinx training needs, please contact us by:

Web: [Request a Class](#)
Email: registrar@fastertechnology.com
Phone: 281-391-5482

Visit www.FasterTechnology.com/training-courses to see our full line of Xilinx education courses.

