

Course Description

Advanced Features and Techniques of Embedded Systems

Development 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.

This course builds on the skills gained in the *Embedded Systems Development course*. Labs provide hands-on experience with the development, verification, debugging, and simulation of an embedded system. All labs use a hardware board, connected to a server, to which designs are downloaded and verified.

Level – Advanced

Course Duration – 2 days

Price – \$1200 USD or 12 Training Credits

Course Part Number – EMBD33000-8-ILT

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

Prerequisites

- Experience in C programming
- *Embedded Systems Development* course or experience with embedded systems design and Xilinx EDK tools
- Some HDL modeling experience
- Basic microprocessor experience and understanding of PowerPC™-processor and MicroBlaze™-processor systems

Software Tools

- Xilinx ISE™ 8.1 SP1
- Mentor Graphics ModelSim
- EDK 8.1

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

- Assemble and architect a complete embedded system
- Identify the steps involved in integrating user IP in a system
- Use a Board Support Package (BSP) to target multiple operating systems
- Apply advanced debugging techniques
- Design a flash memory-based system and boot load from flash
- Apply various techniques to improve performance

Course Outline

Day 1

- Embedded Systems Development Review
- **Lab 1:** Building a Complete Embedded System
- External Memory Controllers and File Systems
- **Lab 2:** External Memory Controllers and File Systems
- Interrupts
- Debugging Using the ChipScope Pro Analyzer
- **Lab 3:** Debugging Using the ChipScope Pro Analyzer
- OCM Bus

Day 2

- Performance Tuning
- **Lab 4:** Performance Tuning
- Board Support Packages (BSPs)
- Bus Functional Modeling Simulation
- **Lab 5:** BFM Simulation
- Boot Loader
- **Lab 6:** Boot Loading from Flash Memory

Lab Descriptions

- **Lab 1:** Building a Complete Embedded System – Develop hardware that incorporates IP cores to interface to push buttons, switches, LEDs, an LCD display, and serial communication. Develop an application that interacts with switches, push buttons, an LCD display, and serial communication. Generate and download a bitstream onto a hardware board connected to a server.
- **Lab 2:** External Memory Controllers and File Systems – Design a system that includes an On-Chip Peripheral Bus (OPB) DDR IP core. Develop an application that performs file-related tasks on external memory.
- **Lab 3:** Debugging Using the ChipScope Pro Analyzer – Perform simultaneous hardware and software debugging on stack-related errors with the ChipScope™ Pro Analyzer, GDB, and XMD.
- **Lab 4:** Performance Tuning – Profile a simple piece of code, using the SDK profile tool, running on a processor and go through iterative steps of refinement to improve the performance by using caching and porting a repetitive function to hardware.
- **Lab 5:** BFM Simulation – Create an EDK system that includes IBM CoreConnect bus architecture Bus Functional Models (BFM) and Bus Functional Language (BFL) constructs for an OPB IP. Simulate the OPB bus-based design to verify IP functionality.
- **Lab 6:** Boot Loading from Flash Memory – Develop an application that performs desired tasks. Due to application size and resource limitations, store it in flash, load it through a boot loader program, and execute from external memory.

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You must have your tuition payment information available when you enroll. We accept credit cards (Visa, MasterCard, or American Express) as well as purchase orders and training credits.