

FPGAs and Embedded Processors

Date and Venue

24-26 March 2009
Glasgow

Cost

£1,350 + VAT per person

(Discounts available please enquire)

Contact

If you have any course queries, please contact Suzanne O'Hare on 01506 469303 or by emailing suzanne.ohare@sli-institute.ac.uk.

Overview

This course will provide attendees with a comprehensive overview of how embedded styled systems can be implemented within a Field Programmable Gate Array (FPGA) and discuss how FPGAs can be used as a platform for System-on-Chip (SoC) styled designs. An introduction to FPGAs and their DSP capabilities will be presented along with a detailed overview of the embedded processor and connectivity options that are available.

The course has a significant practical element using the Xilinx Embedded tool flow which will be used by attendees to implement simple hybrid software/hardware DSP algorithms. Attendees will develop existing Intellectual Property (IP) cores into hardware co-processors and combine these with soft processor cores using the various connectivity options available. Hardware/software debugging techniques will also be presented and demonstrated.

Course Aim

To teach participants how to design and implement embedded systems within FPGA technologies with particular focus on how to develop and integrate DSP styled co-processors within such systems.

Audience

Digital, DSP, FPGA/ASIC and Software engineers who are interested in learning about how embedded systems may be designed and implemented within FPGA technologies.

The course will include:

- Introduction to FPGAs
- System-on-Chip
- FPGA Technology
- FPGA Embedded Processors
- Digital Signal Processing and FPGAs
- Xilinx Embedded Tool Environment
- Introduction to Embedded Systems
- FPGA Embedded Processor Systems.

Achievable Skills

On successful completion of the course, attendees will be able to:

- Appreciate the current applications and capabilities of FPGAs
- Understand FPGA architectures and differences between FPGA families
- Relate traditional microprocessor/microcontroller design, implementation and test techniques to those used within embedded FPGA systems
- Appreciate and relate System-on-Chip (SoC) design methodologies to embedded FPGA system design
- Understand the concept of Intellectual Property (IP) Cores and their use within the SoC design methodology
- Gain knowledge of on-chip network topologies and current available standards
- Understand the use of Real-Time Operating Systems (RTOS) and their use within embedded FPGA systems
- Be aware of the various architectures and capabilities of embedded FPGA processors
- Understand how to use embedded processors within FPGAs to implement DSP algorithms
- Appreciate how hardware acceleration using co-processors can be used to overcome software performance bottlenecks
- Understand how to interface IP Cores to embedded FPGA processors
- Appreciate how multi-processor systems may be implemented within FPGAs
- Use SoC design methodologies and tool flows to implement embedded systems within an FPGA
- Use embedded software tools to implement a DSP software/hardware hybrid design within an FPGA

- Use embedded software tools to perform hardware and software debug of FPGA systems
- Perform software profiling to identify performance bottlenecks.

Pre-requisites

This intensive course is intended for both software and hardware engineers who would like to learn about embedded system in the context of FPGA technologies. The course assumes attendees have previous experience in digital hardware and software design to Bachelor level. Although not essential, attendees would also benefit from prior experience in working with microprocessors and/or microcontrollers as well as a basic understanding of C. Detailed knowledge of Hardware Description Languages is not required.

Course Presentation

The course format is 50% Lectures, 40% Hands-on Labs (Xilinx Embedded Tool Flow) and 10% Demonstrations.

Laboratory Sessions

The laboratory sessions for this course will be based upon the Xilinx Embedded and DSP design flows. Xilinx XPS, ISE™ and System Generator for DSP software tools will be used to design Embedded DSP systems for the Xilinx XUP development kit.

Course Materials

All attendees will receive electronic and printed versions of the teaching materials. A DVD containing all the simulation models used during the course will also be distributed. The notes provided form a superset of the materials presented on the course and will allow further in depth study after the course.

Course Syllabus

The full syllabus is available from www.steepestascent.com.

Fees

The course fee includes handouts, lunches and morning/afternoon refreshments for each delegate.

Accommodation

Information on local hotels is available from Amanda Connelly amanda.connelly@sl-i-institute.ac.uk.

How to Book

Complete the [iSLI and Steepest Ascent Training Course Booking Form](#).