**Embedded Linux Development on Zynq using Vivado Workshop**

**ZedBoard**

**COURSE DESCRIPTION**

This course provides university academics with the resources, high-level skills, and confidence to introduce Embedded Linux development on Zynq using Vivado to their teaching and research programs.

# Install Xilinx software

Professors may submit the online donation request form at <http://www.xilinx.com/member/xup/donation/request.htm> to obtain the latest Xilinx software. The workshop was tested on a PC booted using the LiveUSB running **Ubuntu 14.04 LTS**.

* Vivado 2015.4 + SDK System Edition
* PetaLinux Tools 2015.4
* Follow the LiveUSB Creation Step guide available at http:// [www.xilinx.com/support/university/vivado/vivado-workshops/Vivado-embedded-linux-zynq.html](http://www.xilinx.com/support/university/vivado/vivado-workshops/Vivado-embedded-linux-zynq.html)

1. **Setup hardware**

Connect ZedBoard

* 1. Connect programming cable between configuration port of ZedBoard and PC
  2. Connect another micro USB cable between ZedBoard’s UART port and PC USB port
  3. Connect the power supply and power on the board

1. **Install distribution**

Download and extract the *2015\_4\_zynq\_zedboard\_sources.zip* file in /home/petalinux directory. Rename the extracted folder to **sources**. Download and extract the *2015\_4\_zynq\_zedboard\_labdocs\_pdf*.zip file consists of lab documents in the PDF format. Extract this zip file in /home/petalinux directory or any directory of your choice.

1. **For Professors only**

Download the *2015\_4\_docs\_source.zip* file using your membership account. The *2015\_4\_docs\_source.zip* file contains lab documents in the Microsoft Word and presentations in the PowerPoint format for you to use in your classroom.

1. **Get Started**

Review the presentation slides (see course agenda) and step through the lab exercises (see lab descriptions) to complete the labs.

# COURSE AGENDA

|  |  |
| --- | --- |
| **Day 1 Agenda** | **Day 1 Materials** |
| Class Intro | 01\_class\_intro.pptx | |
| Embedded Linux Overview | 02\_Embedded\_Linux\_Overview.ppt x | |
| Lab 1: A First Look | 02a\_lab1\_intro.pptx  lab1.docx | |
| Introduction to PetaLinux Tools | 03\_Intro\_PetaLinux\_Tools.pptx | |
| Lab 2: Build and Boot Linux | 03a\_lab2\_intro.pptx  lab2.docx | |
| Application Development | 04\_App\_Development.pptx | |
| Lab 3: Application Development and Debug | 04a\_lab3\_intro.pptx  lab3.docx | |
| File Transfer, TCPIP, Networking | 05\_TCPIP\_Networking | |
| Lab 4: Networking | 05a\_lab4\_intro.pptx  lab4.docx | |
| Device Drivers and Loadable Modules | 06\_ Device\_Drivers\_Loadable\_Modules.pptx | |
| Lab 5: Drivers and Modules | 06a\_lab5\_intro.pptx  lab5.docx | |
| **Day 2 Agenda** | **Day 2 Materials** | |
| Introduction to Vivado, SDK, and Zynq | 07\_Board\_Bring\_Up.pptx | |
| Lab 6: Basic Hardware Design using Vivado and PetaLinux Tools | 07a\_lab6\_intro.pptx  lab6.docx | |
| Custom Hardware Development | 08\_Custom\_Hardware\_Development.pptx | |
| Lab 7: Custom Hardware Development | 08a\_lab7\_into.pptx  lab7.docx | |
| Custom Driver Development | 09\_ Custom\_Driver\_Development.pptx | |
| Lab 8: Device Drivers | 09a\_lab8\_into.pptx  lab8.docx | |

**LAB** **DESCRIPTIONS**

Lab 1 - Compare and contrast embedded Linux on Xilinx Zynq SoC and Linux on desktop.

Lab 2 - Build your own kernel image and boot new image via the network.

Lab 3 - Create an application and debug using cross-debugger.

Lab 4 - File transfer, Network File System (NFS) mount, and embedded web-server and web-based applications.

Lab 5 - Create a simple run-time loadable kernel module.

Lab 6 - Create a Linux capable SoC platform from scratch including hardware and kernel.

Lab 7 - Use custom FIR and audio CODEC cores with AXI interface.

Lab 8 - Develop UIO drivers for the custom FIR and audio CODEC cores and an application to test them.

1. **Contact XUP**

Send an email to [xup@xilinx.com](mailto:xup@xilinx.com) for questions or comments