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

**Zybo**

**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 Zybo

* 1. Set the power source jumper to USB
  2. Connect programming cable between PROG JTAG port of Zybo and PC

1. **Install distribution**

Download and extract the *2015\_4\_zynq\_Zybo\_sources.zip* file in /home/petalinux directory. Rename the extracted folder to the **sources** folder. Download and extract the *2015\_4\_zynq\_Zybo\_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 Microsoft Word and presentations in 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

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| **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