**System Design on Zynq using SDx**

**ZedBoard**

**COURSE DESCRIPTION**

This course provides professors with hands-on experience of creating application-specific systems on chip from C/C++ programs using the SDx development environment.

# Install Xilinx software

Professors may submit the online donation request form at <https://www.xilinx.com/support/university/donation-program.html> to obtain the latest Xilinx software. The workshop was tested on a PC running Microsoft Windows 7 professional edition.

* SDx 2017.2
* Download and install software driver, for serial communication using micro-USB cable, available at <http://www.zedboard.org>

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

You will also need Micro-SD card adaptor and a SD card writer

1. **Install distribution**

Extract the **2017\_2\_zed\_source.zip** file in the *c:\xup\sdsoc* directory. This will create a **source** folder. Create the *c:\xup\sdsoc\labs* directory. This is where you will do the labs. The **2017\_2\_zynq\_labdocs\_pdf.zip** file consists of lab documents in the PDF format. Extract this zip file in *c:\xup\sdsoc* directory or any other directory of your choice.

1. **For Professors only**

Download the **2017\_2\_zynq\_docs\_source.zip** file using your membership account. Do not distribute them to students or post them on a web site. The **2017\_2\_zynq\_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 |
| Zynq Architecture and Vivado IPI | 11\_Zynq\_Architecture\_and\_Vivado\_IPI.ppt x |
| SDSoC Overview | 12\_SDSoC\_Overview.pptx |
| Lab 1: Creating a System with SDSoC | lab1.docx |
| Data Motion Networks | 13\_DataMotion\_and\_Optimization.pptx |
| Lab 2: Pragmas and Data Motion Networks | lab2.docx |
| Coding Considerations | 14\_Coding\_Considerations |
| Profiling | 15\_Profiling |
| Lab 3: Profiling Application and Create Accelerators | lab3.docx |
| **Day 2 Agenda** | **Day 2 Materials** |
| Estimation and Events Tracing | 21\_Estimation\_and\_Events\_Tracing.pptx |
| Lab 4: Estimating Accelerator Performance and Events Tracing | lab4.docx |
| Debugging | 22\_Debugging.pptx |
| Lab 5: Debugging | lab5.docx |
| Using C-Callable Libraries and Creating Multiple Accelerators | 23\_C\_Callable\_Multiple\_Accelerators.pptx |
| Improving Performance with Vivado\_HLS | 24\_Vivado\_HLS |
| Lab 6: Fine-Tuning with Vivado | lab6.docx |
| SDSoC Platform | 25\_Platform\_Creation.pptx |
| Lab 7: Creating and Using Platform for an Application | lab7.docx |

**LAB** **DESCRIPTIONS**

Lab 1- Go through the process of using SDSoC to create a new project using available templates.

Lab 2 - Handling data movements between the software and hardware accelerators using various pragmas and SDSoC API.

Lab 3 - Profiling an application, analyzing the results, identifying function(s) for hardware implementation.

Lab 4 - Estimating the expected performance of an application when functions are targeted in hardware, without going through the entire build cycle.

Lab 5 - Debugging software application targeting Standalone and Linux OS in SDSoC.

Lab 6 - Using various techniques and directives of Vivado HLS which can be used in SDSoC to improve design performance.

Lab 7 - Creating a custom platform for an audio application.

1. **Contact XUP**

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