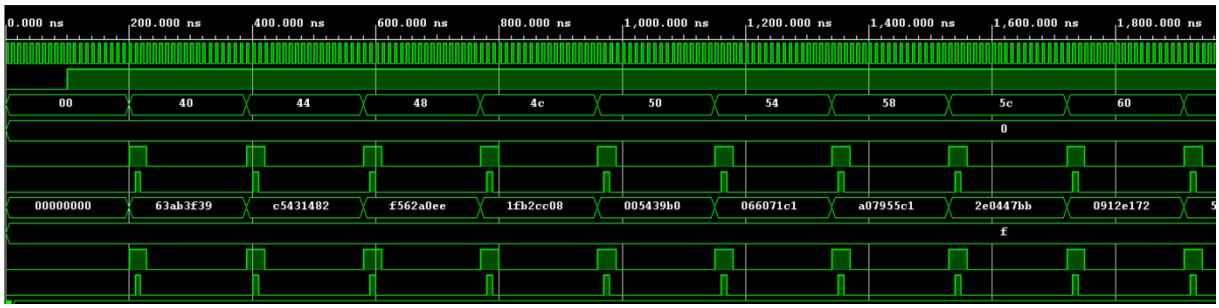
FPGA Course for Scientists

by Pau Gómez & Red Pitaya



About this Course

FPGA Course for Scientists is a comprehensive hands-on program designed for scientists and engineers with little to no FPGA programming experience. Through practical examples and incremental learning, participants will develop the skills to create custom FPGA designs interfacing with digital & analog IOs.

About the Instructor

Dr. Pau Gómez is a physicist and FPGA developer specializing in Quantum Physics and high-speed Digital Electronics. With extensive experience in quantum applications and FPGA development, he brings practical expertise in:

- Quantum Key Distribution
- Zynq SoC platforms
- High-speed Digital Electronics
- FPGA development and education

Course Details

Format: 6 sessions (one per week), 3 hours each

Session Breakdown:

1. **Week #1:** Introduction & Red Pitaya basics
2. **Week #2:** Vivado setup & deployment
3. **Week #3:** Behavioral simulation

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4. **Week #4:** High-speed ADC/DAC
5. **Week #5:** Direct Digital Synthesis
6. **Week #6:** DMA & waveform generation

Topics Covered

- Red Pitaya as an open-source software-defined instrument
- Xilinx Zynq FPGA architecture
- Vivado development environment
- PYNQ (Python runtime configuration)
- VHDL/Verilog development
- Digital & Analog IOs
- Advanced signal processing

Required Hardware

- PC/Laptop (Windows, Mac OS, Linux)
- STEMlab 125-14 Starter Kit
- Micro-USB cable
- SMA cables (2x)
- Oscilloscope
- BNC-to-SMA converters (2x)

Course Format

- 100% remote delivery
- Pre-configured remote Linux servers provided
- Recorded sessions available
- Weekly assignments
- Limited to 20 participants

Frequently Asked Questions

Prerequisites & Requirements

Q: Do I need prior FPGA experience?

A: No, the course is designed for beginners. Basic programming knowledge is helpful but not required.

Q: What hardware is mandatory?

A: You'll need a STEMlab 125-14 kit and associated cables/converters. Course participants receive a 15% discount on the Red Pitaya board.

Course Structure

Q: What's the time commitment?

A: Expect 5-7 hours weekly: 3 hours for live sessions plus assignment time.

Q: What if I miss a session?

A: All sessions are recorded and available for review. However, live attendance is recommended for interactive learning.

Technical Aspects

Q: Do I need to install special software?

A: No, we provide pre-configured remote Linux servers with all the necessary

software.

Q: What programming languages are used?

A: VHDL/Verilog for FPGA programming and Python for control/configuration.

Learning Outcomes

Q: What will I be able to do after the course?

A: You'll be able to:

- Create basic FPGA designs

- Interface with digital/analog I/Os
- Implement signal processing applications
- Use industry-standard tools
- Deploy FPGA applications

Administrative

Q: What's the cost?

A: 650€ (VAT excluded)

- Early-bird price: 600€ (first 10 customers)
- Hardware discount: 15% off STEMlab 125-14 kits

Q: Will I receive a certificate?

A: Yes, upon successful course completion.

Support

Q: What support is available?

A: You'll have access to:

- Live Q&A during sessions
- Assignment feedback
- Technical support
- Course materials
- Recorded sessions

Registration

REGISTRATION FORM