Advanced VHDL

FPGA 4

LANG-ADVVHDL (v1.0)

Course Specification

Course Description

Increase VHDL proficiency by learning advanced techniques for writing more robust and reusable code.

The focus is on:

- Writing efficient and reusable RTL, testbenches, and packages
- Creating self-testing testbenches
- Creating realistic models
- Using the text I/O capabilities of the VHDL language
- Storing simulation data dynamically
- Creating parameterized code for design reuse

This comprehensive course is targeted toward designers who already have some experience with VHDL.

What's New for 2021.1

- All labs have been updated to the latest software versions

Level – FPGA 4

Course Details

- 2 days live instructor led training (online or in person)
- 9 lectures
- 6 labs

Price – $1,600 or 16 Xilinx Training Credits

Course Part Number – LANG-ADVVHDL

Who Should Attend? – VHDL users with intermediate knowledge of VHDL

Prerequisites

- Designing with VHDL course or equivalent knowledge of modeling, simulation, and RTL coding
- At least six months of coding experience beyond an introductory course

Software Tools

- Vivado® Design Suite 2021.1

Hardware

- Architecture: N/A*
- Demo board: None*

* This course does not focus on any particular architecture. Check with your local Authorized Training Provider for specifics or other customizations.

After completing this comprehensive training, you will have the necessary skills to:

- Write efficient and reusable RTL, testbenches, and packages
- Create self-testing testbenches
- Create realistic models
- Use the text I/O capabilities of the VHDL language
- Store simulation data dynamically
- Create parameterized code for design reuse

Course Outline

Day 1

- VHDL Overview
- Simulation Concepts
- Advanced Data Types
- Subprograms and Design Attributes
- **Lab 1:** Flexible Functions
- Access Type Techniques and Blocks
- **Lab 2:** Linked Lists with Access Types
- Utilizing File IO
- **Lab 3:** TextIO Techniques

Day 2

- Advanced Techniques in VHDL
- **Lab 4:** Creating Real-World Simulations
- Supporting Multiple Platforms
- **Lab 5:** Supporting Multiple Platforms
- Non-Integer Numbers
- **Lab 6:** Implementing Fixed and Floating Point Numbers
- Appendix: Guarded Signals

Lab Descriptions

- **Lab 1:** Flexible Functions – Construct and use predefined attributes to build functions and procedures that automatically adjust to the size of the passed arguments as well as creating a reusable module with unconstrained ports.
- **Lab 2:** Linked Lists with Access Types – Create linked lists to capture arbitrarily large data sets. Also included in this lab is a reusable helper package for managing singly linked lists.
- **Lab 3:** TextIO Techniques – Load memory for synthesis via a text file using the TextIO extensions for std_logic and std_logic_vector as provided by the std_logic_TextIO package.
- **Lab 4:** Creating Real-World Simulations – Create spread-spectrum clocks with jitter and other real-world factors. Model board and behavioral component delay.
- **Lab 5:** Supporting Multiple Platforms – Effectively use configuration statements, conditional generates, and scripts to build variations on VHDL themes.
- **Lab 6:** Implementing Fixed and Floating Point Numbers – Construct a simple fixed point math example and compare to the IEEE_PROPOSED fixed and floating point models.

Register Today

Morgan Advanced Programmable Systems, Inc. (Morgan A.P.S.) delivers public and private courses in locations throughout the central US region; including Iowa, Illinois, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.

Visit **morgan-aps.com/training**, for full course schedule and training information.

You must have your tuition payment information available when you enroll. We accept credit cards (Visa, MasterCard, or American Express) as well as purchase orders and Xilinx training credits.

Student Cancellation Policy

- Student cancellations received more than 7 days before the first day of class are entitled to a 100% refund. Refunds will be processed within 14 days.
- Student cancellations received less than 7 days before the first day of class are entitled to a 100% credit toward a future class.
- Student cancellations must be sent here.

Morgan A.P.S. Course Cancellation Policy

- We regret from time-to-time classes will need to be rescheduled or cancelled.

- In the event of cancellation, live on-line training may be offered as a substitute.
- Morgan A.P.S. may cancel a class up to 7 days before the scheduled start date of the class; all students will be entitled to a 100% refund.
- Under no circumstances is Morgan A.P.S. responsible or liable for travel, lodging or other incidental costs. Please be aware of this cancellation policy when making your arrangements.
- For additional information or to schedule a private class contact us here.

Online training with real hardware

During the Covid-19 period, some companies do not allow their staff to participate in live in-person training.

- Consequently, Morgan Advanced Programmable Systems, Inc. has set up a training VPN where engineer participants can take classes online using the same computers and devCards used during in-person training.
- Even better, and upon request, you can use these computers after hours on training days to experiment with labs. This is not possible for in-person training.
- Additionally, just like in-person training, the laptops and devCards, tools, OS, and licensing are set up in advance.
- In some ways, live online-training is better than in-person…for example, you can grant the instructor permission to look at your Vivado, PetaLinux terminal, or Vitis for extended periods of time if your lab is not going exactly has planned to a missed step.
- This is often more comfortable than two engineers crowding around a laptop screen.
- Taking remote training also allows you to learn some tips and tricks for working remote. Whether your devCard is in the lab down the hall, or across the world via VPN, you can control your Xilinx based device quickly and efficiently.