

Introduction:

In this course, we will explore and learn some of the essential skill set that is required for the VLSI and Embedded professionals.

Objectives:

By the end of this course, you should be able to:

1. Design digital hardware modules
2. Effectively use Verilog HDL constructs to model digital hardware modules
3. Have deeper understanding of the FPGA architecture
4. Explain and take any RTL design the FPGA design flow
5. Implement the RTL design on a given FPGA kit
6. Build Embedded Systems using FPGA using Picoblaze and Microblaze soft-processors
7. Implement RTOS based systems on FPGA
8. Implement processor IP and further explore SoC based designs on FPGA
9. Write and analyze scripts in perl
10. Understand Embedded Systems concepts and apply them

Pre-requisites:

1. Digital logic
2. Knowledge of VHDL and /or Verilog HDL is desirable



Who should attend?

This course is meant for graduate, post-graduate students and fresh engineers who wish to develop their skill set in verification methodologies. It is beneficial for corporate people who wish to enhance their skill set for better opportunities.

Contents:

Stage 1:

1. Verilog HDL Review
 1. Fundamentals of Verilog HDL
 2. Constructs in Verilog for hardware modeling
 2. Modeling Combinational and Sequential Digital Systems
 3. Modeling Finite State Machines (FSMs)
 4. Modeling memories such as RAMs, ROMs and FIFOs in Verilog
2. Verification fundamentals and verification flow

Stage 2:

FPGA flow

1. FPGA architecture
2. Xilinx Design Tools
3. Design Entry and Simulation
4. Synthesis
5. Pin Configuration
6. Timing Constraints and Analysis
7. Porting and testing the design on FPGA
8. Debugging with ChipScope



Stage 3:

SoC design principles on FPGA

1. Introduction to processor design in FPGA
 - a. Case study: Design of the Gumnut processor
2. Introduction to system busses
3. Introduction to protocols
4. Introduction to peripheral IP design

Stage 4:

Embedded Systems Concepts

1. Introduction to Micro-controllers
2. Introduction to ATmega micro-controllers
3. Experiments with Arduino platform
4. Case study

Embedded Systems on FPGA

1. Introduction to Picoblaze processors
2. Embedded systems design on FPGA using Microblaze softprocessors
3. Case Study
4. RTOS on Microblaze



Stage 5:

Scripting with perl

1. Introduction to *perl*
2. Operators, literals and variables
3. Arrays and Hashes
4. Sub-routines
5. Statements and loops
6. Regular expressions
7. Special variables
8. File I/O and directory operations
9. Introduction to networking in *perl*
10. Working with databases

Cost:

Rs. 15000/-

Mode of delivery:

1. Class-room sessions
2. Online