

VLSI Design & Embedded System Advance Training



6 months



We create value by bridging academia to the semiconductor industry. Our training modules have been designed by experienced industry professionals to close the gap between classroom curriculum and real employment aptitude. We accomplish this goal by exposing you to key industry concepts, imparting intense training on the latest and most advanced technology tools, while also allowing you to network with industry mentors with an opportunity to land your dream job!

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<http://www.incise.in>

About Us

At INCISE, our mission is to transform fresh engineers into working professionals by reducing the industry-academia gap via great opportunities for learners to equip themselves with latest Embedded and VLSI technologies that are in use as well as those setting trends in the semiconductor industry.

Salient Features of the Program

The course curriculum is handled by qualified instructors who have had vast experience handling complex, multi-faceted projects for leading semiconductor companies and associated design partners.

1. Six-months practical training on Embedded and VLSI domain
2. Guidance on complete life cycle of two projects within domains of your choice with standard industry deliverables
3. Dedicated Embedded or FPGA boards provided to each student
4. Six free SIRI™ (Student Industry Readiness Index) evaluation tests after completion of each module
5. One expert career counseling session with an *industry leader*
6. Free CV preparation by our Career Development Office
7. Candidate profile on INCISE website for placements
8. Frequent sessions on latest trends in the semiconductor recruitment process with guidance on interview preparation, FAQs and mock interviews
9. First 3 modules of the VLSI course are compulsory and after that students have a choice to opt for advanced 3-modules based on the interest.
10. A “Certificate of Excellence” will be issued on successful completion of the training
11. Guaranteed interview calls – Two calls for every candidate; For candidates who score 75% up on all SIRI Tests will be 100% placed in core semiconductor companies.

The training is *strictly practical* providing students with an opportunity to get their hands and feet wet on product architectures, designing, programming and validation using latest tools and techniques sought by top employers worldwide.

Experts Training Overview

INCISE’s six-month program caters to engineering candidates who wish to quickly become industry-hardened professionals by learning to work on Embedded and VLSI development systems and projects in their domains of interest - preparing them to confidently face the rigors of the semiconductor world. Every student is assigned couple of projects and these projects would be divided into the following phases:

1. Project Feasibility & Study
2. Technical Architecture Development, coding, testing and validation
3. Tools, Software, Hardware Requirement, study and development.

INCISE® Certified 6-months VLSI Experts Program (with Project)

Module #1

- Digital Design concepts and building blocks
 - Combinational Circuits
 - Sequential Circuits
 - Shift Registers
 - Memory
- Basics of Verilog HDL
- Implementation of basic building blocks in Verilog HDL
- Level of design abstraction in Verilog
- Lab # : Designing Counters
- Lab # : Design Digital Clock

Module #2

- What is a Simulator? How does it work?
- Verification of designs using Waveforms
- Introduction to Functional Verification
- Creation of block-level Test Bench & Test Cases in HDL
- Introduction to HVL (System Verilog)
- Advanced System Verilog
- Lab # : Create Test Bench for Digital Clock

Module #3

- What is a Library?
- Introduction to Synthesis
- Writing Synthesizable Designs
- Introduction to DFT
- Introduction to Timing Verification
- Lab # Synthesis and DFT of Digital Clock

Module #4

- Advanced Design Concepts
- FSM, Mealy & Moore Machines
- Synchronous Circuits
- Clock and Timing
- Multi-Clock Designs
- Blocking & Non-Blocking Statements
- Lab # Implementation of Vending Machine using State-Machines

Module #5

- System Overview and Advanced Concepts
- RISC Microcontroller Overview
- Processor Driven Verification
- C & Assembly Code Execution and Loading
- Introduction to AMBA Bus
- Scripting Languages & Automation

Module #6

- ASIC v/s FPGA
- FPGA History and Evolution
- FPGA Architecture
- FPGA Programming Flow
- FPGA Synthesis and Mapping
- FPGA Debugging and Validation
- Lab : # Mapping and Validation of Digital Clock
- Lab :# Mapping and Validation of Vending Machine

Major Project Work

- Specification Development
- Micro-architecture Designing
- Coding, Verification & FPGA Validation

INCISE® Certified 6-months Embedded Experts Program (with Project)

Module #1

Processor Architecture and Programming Basics

- Computer Hardware and Stored Program Computer concept
- Typical 'C' Program Execution
- How Instruction Cycle works?
- How Interrupts are executed?
- Conversion from High Level Language to Assembly Language
- Performance Analysis of CPU
- RTOS basic programming in 'C'

Module #2

Structured Programming in 'C'

- 'C' Language Basics
- Control Flow
- Functions & Pointers
- Arrays and Strings
- User Defined Types
- Basic File Handling
- Program Organization
- Coding Guidelines
- Storage Allocation
- Standard Libraries
- Strings
- Dynamic Memory Allocation
- Complex Data Types
- Advanced File Handling
- Advanced Arguments
- Preprocessing
- Production-level Coding

Module #3

Object Oriented Programming in C++ (opt.)

- Basics of C++
- Object Handling

- Tools and Techniques (e.g. GDB, Valgrind, etc.)
- Constructors and Destructors
- Inheritance and more
- Polymorphism
- More on Polymorphism
- Exception Handling

Module #4

ARM/8051 Processor (Optional)

- RISC Processor Fundamentals
- ARM/8051 Architecture Basics
- JTAG and UART Communication
- Board Specification
- Board Level Communication and Programming

Module #5

Compiler/ Assembler/ Linker/ Loader

- Compiler concepts
- Linker, Loader & Interpreter
- Lex and YACC programming
- Assembly language and Microcontroller Programming (Board Specific)
- x86 Assembly Programming
- Microcontroller Programming
- EDA Software Life Cycle

Module #6-7

Industrial Projects on Devt. Boards

- Software Development Life Cycle (SDLC) Models and Phases
- Requirements Analysis and Specification Development
- High and Low-Level Design
- Project Coding & Testing
- Project Review, Delivery and Acceptance

INCISE® Certified 3-months Advanced ASIC Verification Program

(optional)

Module #1

Asic verification methodologies

- Directed Vs random
- Functional verification process
- Stimulus generation
- Bus functional model
- Monitors and reference models
- Coverage driven verification
- Verification planning and management

Module #2

System Verilog Introduction

- Different Data Types
- Arrays
- Associative Arrays.
- Queues
- Array Methods.
- Casting
- Processes
- System verilog classes
- Random Constraints.
- Inter Process communication.
- SV Programming block.

Module #3

System Verilog Assertions and Functional Coverage

- Concurrent Assertions
- Multi Clock Support.
- Assert, assume and cover.
- Binding
- Expert
- Clock resolution
- Covergroup
- Coverage points.
- Bins Transitions

- Cross coverage
- Coverage methods
- System verilog interfaces.

Module #4

OVM and VMM Introduction

- OVM Introduction
- Common message Service.
- Stimulus and Generation
- Transactors
- VMM Introduction.

INCISE® Certified 3-months ASIC Synthesis Program and Static timing Analysis (optional)

Module #1

Synthesis Coding Style

- Registers in verilog
- Unwanted latches
- Operator synthesis
- RTL coding style.
- Transition from RTL description into gates and flip flops
- Optimization of logic
- Placement and routing of optimized netlist.

Module #2

High level Synthesis

- Multi-cycle functionality
- Loops.
- Memory access
- Lexical processing
- Algorithm optimization
- Control/dataflow analysis
- Library processing
- Resource allocation
- Scheduling
- Functional unit binding
- Register binding
- Output processing

Module #3

Static Timing Analysis

- Introduction to STA
- Comparison with DTA
- Timing paths and constraints
- Different types of clocks
- Clock domain and variations
- Clock distribution networks
- How to fix timing failures

Selection Criteria

Eligibility	BE / ME in EE, E&C, CSE, IT, Telecom, Instrumentation or MSc. Electronics
Selection Process	SIRI™ (Student Industry Readiness Index) evaluation tests
Subjects to be referred	<ul style="list-style-type: none">▪ Basics of Digital and Analog Electronics.▪ Microprocessor Fundamentals.▪ General Aptitude.▪ Basics of Programming
Faculty	<ul style="list-style-type: none">▪ Technical Managers▪ Project Leaders▪ Sr. Design Engineers

Course Timings

- Official Lectures, Presentations and Labs will be conducted every alternate day from 9:00AM to 6:00PM
- Labs facilities will be provided 24x7 for extra practice and completion of assignments

Reference Books/Materials

- We recommend the following books for personal learning as part of the program-
 - VHDL - Douglas Perry
 - Verilog HDL - Samir Palnitkar
 - Logic and Computer Design Fundamentals - M. Morris Mano and Charles R. Kime
 - "C" - Dennis Ritchie and Brian Kernighan
 - FPGA-Based System Design - Wayne Wolf
- Specific papers published by industry leaders and top professors will be shared
- Confidential industry material on Microcontrollers and FPGA's from our industry partners

Course Fee

Total Fee*(6-months)	INR 40,000/- **(all inclusive)
* Installment options are also available	
** Discount up to Rs 7000 on current prevailing rates, depends on the entrance test.	

Registration Procedure

Email us at register@incise.in or call us @ +91-93128 82717 / 0120-4272220 addressed to Mr. Akshat Gupta.

To know more about SIRI, please visit <http://www.incise.in/DemoSIRIEvaluation.aspx>

Other Offerings**

- Two Days Embedded Systems Workshop
- Two Days VLSI Design Workshop
- One Day Mobile Technology Workshop
- Two Days Ethical Hacking and Linux GURU Workshop
- Two Months Embedded Systems Summer Training Program
- Two Months VLSI Design Summer Training Program
- Six Month Project Guidance and Development Program
- Twelve Months Semiconductor “GURU” training on Embedded and VLSI systems with Project Guidance

*** The order of training modules, contents and focus on subject matter may change depending upon the composition of the class and their interest.*

Disclaimer: This document contains overview of the VLSI and Embedded design courses presented by INCISE. It describes course outlines and INCISE reserves the right to change and modify the course contents as per the latest requirements from leading semiconductor companies. All the material presented in this document is the property of INCISE. It should not be distributed, published or reproduced without the written consent from INCISE. “Incise Infotech Pvt. Ltd.” and “INCISE” are registered and copyrighted. “SIRI” is a corporate trademark.