GLOW LOGICS
SOLUTIONS

VLSI
BROCHURE

MSME
MICRO, SMALL & MEDIUM ENTERPRISES
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Ministry of MSME, Govt. of India

ISO 9001 2015 CERTIFIED

TechFest
IIT BOMBAY

About Glowlogics

Glowlogics is a **government-verified MSME and Startup India-recognized company offering ISO-certified internships. In partnership with Techfest, IIT Bombay**, & **E-cell Hydrabad**

we are committed to fostering innovation and skill development, providing practical, industry-relevant expectations

Unlock the Future of Chip Design with Our VLSI Program

Step into the dynamic world of **Very Large Scale Integration (VLSI)** with our industry-focused training program. Designed for aspiring engineers and tech enthusiasts, this course offers practical exposure to **IC design, simulation, and optimization techniques**. Gain the skills needed to thrive in the **semiconductor and electronics industry** with hands-on tools and expert mentorship.

What is VLSI?

VLSI is a technology used in electronics to combine thousands to millions of transistors onto a single chip or integrated circuit (IC). It plays a crucial role in the development of modern digital devices such as **microprocessors, memory units, and high-performance chips**, making them smaller, faster, and more efficient. VLSI is the foundation of today's advanced electronic systems.

Curriculum Overview

Module 1: Introduction to VLSI

- Overview of VLSI technology

- VLSI Design Flow: From specification to fabrication

- Moore's Law and its relevance to VLSI

- Applications of VLSI in various domains (e.g., telecommunications, automotive, consumer electronics)

Module 2: MOS Transistor Theory

- MOSFET basics: Structure and operation

- I-V characteristics of MOS transistors

- Threshold voltage, mobility, and channel length modulation

- Scaling of MOS devices

Module 3: CMOS Technology and Design

- CMOS Inverter: Operation and characteristics

- Static and dynamic power dissipation in CMOS

- Noise margins, propagation delay, and fan-out

- CMOS Logic Gates: AND, OR, NAND, NOR, XOR design

Module 4: Combinational Logic Design

- Design and analysis of combinational circuits

- Logic gates, multipliers, and adders (Half and Full Adders)

- Timing analysis and optimization techniques

- Introduction to Verilog for combinational design

Module 5: Sequential Logic Design

- Latches, flip-flops, and registers
- Synchronous and asynchronous sequential circuits
- State machines: Mealy and Moore models
- Verilog for sequential design

Module 6: Physical Design and Layout

- Introduction to physical design steps
  - Partitioning
  - Floorplanning
  - Placement and routing
  - Design rule checks (DRC)
- Layout design using EDA tools (e.g., Cadence, Synopsys)

Module 7: Timing and Power Analysis

- Clock distribution and skew
- Setup and hold time analysis
- Power dissipation in digital circuits
- Techniques to reduce power consumption: Clock gating, voltage scaling

Module 8: Design for Testability (DFT)

- Importance of testability in VLSI

- Scan chains and boundary-scan design

- Built-in self-test (BIST) techniques

- Fault models and automatic test pattern generation (ATPG)

Module 9: FPGA Basics and Programming

- Introduction to FPGA architecture

- FPGA vs ASIC

- Basic programming of FPGA using Verilog

- Implementing digital circuits on FPGA

Module 10: Industry Trends and Future Scope

- Recent advancements in VLSI (FinFETs, 3D ICs, Quantum Computing)

- Industry demands and career opportunities in VLSI

- Future trends: IoT, AI accelerators, and automotive VLSI

Sample Projects

These are sample projects only. Unique capstone projects will be discussed in the live class

- DESIGN OF 32-BIT RISC PROCESSOR USING VHDL/VERILOG
- LOW POWER VLSI DESIGN TECHNIQUES FOR CMOS CIRCUITS
- FPGA-BASED DIGITAL SIGNAL PROCESSING (DSP) SYSTEM DESIGN
- DESIGN AND IMPLEMENTATION OF ARITHMETIC LOGIC UNIT (ALU)
- DESIGN OF HIGH-SPEED MULTIPLIER USING VEDIC MATHEMATICS
- CMOS OPERATIONAL AMPLIFIER (OP-AMP) DESIGN

Career Opportunities

Upon completing the VLSI Certification Program, students will be equipped for roles such as:

- VLSI Design Engineer
- ASIC Design Engineer
- FPGA Design Engineer
- Physical Design Engineer

Certificates

CERTIFIED ISO 9001 CERTIFIED

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CERTIFICATION OF INTERNSHIP

Congratulation, **SAMPLE NAME**

has successfully completed WEB DEVELOPMENT Internship at Glowlogics Solutions in the month of 12 MAR 2025 to 09 MAY 2025
We appreciate [his/her/their] efforts and wish [him/her/them] success in future endeavors.

Academic Head

MSME Ministry of MSME, Govt. of India

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ID : WD25-GL01-I009 Issue Date : 12 March 2025

SAMPLE

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CERTIFICATE

OF COURSE COMPLETION

THIS CERTIFICATE IS PROUDLY PRESENTED TO

SAMPLE NAME

has successfully completed Web Development certification with Grade A+ from Glowlogics Solutions and has proven his/her competency with utmost dedication and promise

7 April 2025
Date

ISO 9001

Academic Head

Certificate ID: WD25-GL01-C011

SAMPLE

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