

NIELIT Virtual Academy

Course Prospectus

Introduction to VLSI Fundamentals STA Fundamentals - Timing Paths - Constraints - Timing Analysis - Timing Closure			Mode of conduction Online (Self-Placed)
Course Code SP15	Starting Date 7 September 2027	Duration 17 hours	Total Fee Rs. 600/-

Objective of the Course

This skill-oriented course provides participants with the knowledge and practical experience necessary to develop a strong foundation in Very Large Scale Integration (VLSI) design. The course covers the fundamentals of VLSI technology, MOSFET operating principles, CMOS logic design, inverter characteristics, combinational and sequential circuit design, and basic VLSI layout concepts. It provides a practical approach to understanding CMOS-based digital design and its application in modern integrated circuits, with hands-on exposure to VLSI laboratory experiments, circuit analysis, simulation, stick diagrams, well structures, and layout design techniques essential for developing efficient and reliable digital integrated circuits.

Outcome of the course

Provide participants with the knowledge and practical skills required for VLSI design, including VLSI fundamentals, MOSFET operation and characteristics, CMOS inverter design, combinational and sequential circuit design, CMOS-based adder implementation, VLSI laboratory experimentation, stick diagrams, well structures, and basic layout design techniques as per industry standards.

Methodology

- Instructor-Led Recorded Sessions
- Structured Day-wise Learning
- Doubt & Tutorial Sessions

Eligibility

- Currently pursuing 3rd year of undergraduate studies.
- Completed 3rd year B.Sc. in Electronics.

Contact Details

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Course Structure

Module 1 VLSI and MOSFET Fundamentals	Module 2 CMOS Logic and Combinational Circuits	Module 3 CMOS Sequential Circuit Design	Module 4 VLSI Layout Design
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01

VLSI and MOSFET Fundamentals

Fundamentals of VLSI design, VLSI architecture and design overview, MOSFET fundamentals and operating principles, MOSFET characteristics and laboratory setup.

02

CMOS Logic and Combinational Circuits

CMOS inverter operation and electrical characteristics, VLSI design laboratory experimental session I, CMOS-based combinational logic design, VLSI design laboratory experimental session II, CMOS implementation of a single-bit adder, VLSI design laboratory experimental session III.

03

CMOS Logic and Combinational Circuits

CMOS-based sequential circuit design, VLSI design laboratory experimental session IV.

04

CMOS Logic and Combinational Circuits

VLSI layout fundamentals, stick diagrams and well structures, layout design principles and implementation.

Examination & Certification

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1	Theory	40
2	Project (Submission + Presentation)	60
Total		100

Note:

After successful completion of the course, candidate will get an online certificate with the following Grading Scheme

Marks Range	Grade	Certificate Type
> 85 %	S	Graded
75 - 84 %	A	Graded
65 - 74 %	B	Graded
55- 64 %	C	Graded
50 - 54 %	D	Graded
< 50 %	F	Participation
ABSENT	N	Participation