Subject Code : P8EL7

VLSI DESIGN AND VHDL TOOLS

Unit-I Introduction to MOS Technology:

Introduction- Basic MOS transistors – Enhancement mode transistor action-Depletion mode transistor action – n-MOS fabrication-n-MOS and C-MOS design rules-Basic electrical properties of MOS circuits – Scaling of MOS circuits- Inverters – super buffers-universal logic(NAND and NOR) circuits- Systems steering logic design – threshold voltage equation – basic dc equation – II order effects of MOS modules – Small signal ac characteristics.

Unit-II: Date and control flow in Systematic structure:

Introduction – 2 phase clocking and generator using D – flip-flops-Dynamic register- Dynamic shift register – Basic arrangement for bus lines – Combinational logic: Parity generator, Bus Arbitration Logic for n-line bus – Multiplexers – Programmable Logic Array – Finite State Machine.

Unit-III LSI Computer System Design:

System overview-overall structure of data path – ALU – Registers – Buses – Barrel shifter – Resister array- System-timing analysis.
C-MOS design projects: An Incrementer/Decremental – Left/Right Shift serial/Parallel Register.
Data flow modeling: Concurrent Signal Assignment Statement-Multiple Drivers – Conditional Signal Assignment Statement- Block Statement – Concurrent Assertion Statement – Value of a Signal.
Hardware Modeling: Modeling synchronize Logic –Clock dividers.

Unit – IV - VISI FABRICATION TECHNIQUES:

An overview of wafer fabrication – wafer processing – oxidation – pattering diffusion-ion implementation deposition – si gate n MOS process – C MOS process-n well-p well-Twin tub – si on insulator-C MOS process enhancement- interconnect circuit elements.

Unit –V Hardware Description Language:

Basic language Elements-Data Objects – Date types – Operators – Behavioral Modeling – Entity Declaration- Architecture Body-Process Statements – Variable Assignment statement – Signal Assignment Statement – Wait statement – If Statement Case statement- Null statement – Loop statement-Exit statement – Next statement – Assertion Statement – Report statement – More on signal assignment statement – Other sequential statements – Multiple Processes – Postponed Processes.

Text Books:

1. Principle of CMOS VLSI design – Neil H.E.Weste and Kamaran Eshragtian Addison Wes leg (1985).
2. Basic VLSI Design – Daughlas A Puck Nell.
3. A VHDL Primer – J.Bhasker – Pearson Education – III edition.

Reference Books:

1. IC fabrication Technology – Elliot.
   Introduction to VLSI design – Convey C.Mead.