GANDHI SCHOOL OF ENGINEERING

BHABANDHA, BERHAMPUR

BRANCH:- ELECTRONICS & TELECOMMUNICATION ENGINEERING

SEMESTER:- 5TH

SUBJECT:- VLSI & EMBEDDED SYSTEM

Name of the Faculty- ER PRETEESHA MAHAPATRA

	Topic to be taken				Actual topic taken			
Sl. No	**Topic/Module**	**No. of period**	**Details of the topics**	**Date**	**Topic No.**	**Topic Name**	**Date**	**Remarks**
1	Introduction to VLSI & MOS Transistor	**12**	1.1 Historical perspective- Introduction 1.2 Classification of CMOS digital circuit types 1.3 Introduction to MOS Transistor& Basic operation of MOSFET. 1.4 Structure and operation of MOSFET (n-MOS enhancement type) & COMS 1.5 MOSFET V-I characteristics, 1.6 Working of MOSFET capacitances. 1.7 Modelling of MOS Transistors including Basic concept the SPICE level-1 models, the level-2 and level-3 model. 1.8 Flow Circuit design procedures 1.9 VLSI Design Flow & Y chart 1.10 Design Hierarchy 1.11 VLSI design styles-FPGA, Gate Array Design, Standard cells based, Full custom	**15/09/2022 TO 13/10/2022**	1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8	Historical perspective- Introduction Classification of CMOS digital circuit types Introduction to MOS Transistor& Basic operation of MOSFET. Structure and operation of MOSFET (n-MOS enhancement type) & COMS MOSFET V-I characteristics Working of MOSFET capacitances. Modelling of MOS Transistors including Basic concept the SPICE level-1 models, the level-2 and level-3 model. Flow Circuit design procedures	**15/09/2022** **15/09/2022** **16/09/2022** **19/09/2022 & 21/09/2022** **22/09/2022** **23/09/2022** **26/09/2022 & 28/09/2022** **29/09/2022**	

					1.9	VLSI Design Flow & Y chart	**30/09/2022**	
					1.10	Design Hierarchy	**12/10/2022**	
					1.11	VLSI design styles-FPGA, Gate Array Design, Standard cells based, Full custom	**13/10/2022**	
2	Fabrication of MOSFET	**10**	2.1 Simplified process sequence for fabrication 2.2 Basic steps in Fabrication processes Flow 2.3 Fabrication process of nMOS Transistor 2.4 CMOS n-well Fabrication Process Flow 2.5 MOS Fabrication process by n-well on p-substrate 2.6 CMOS Fabrication process by P-well on n-substrate 2.7 Layout Design rules 2.8 Stick Diagrams of CMOS inverter	**14/10/2022 TO 03/11/2022**	2.1	Simplified process sequence for fabrication	**14/10/2022**	
					2.2	Basic steps in Fabrication processes Flow	**17/10/2022**	
					2.3	Fabrication process of nMOS Transistor	**19/10/2022 & 20/10/2022**	
					2.4	CMOS n-well Fabrication Process Flow	**21/10/2022 & 26/10/2022**	
					2.5	MOS Fabrication process by n-well on p-substrate	**27/10/2022**	
					2.6	CMOS Fabrication process by P-well on n-substrate	**28/10/2022**	
					2.7	Layout Design rules	**02/11/2022**	
					2.8	Stick Diagrams of CMOS inverter	**03/11/2022**	
3	MOS Inverter	**09**	3.1 Basic nMOS inverters, 3.2 Working of Resistive-load Inverter 3.3 Inverter with n-Type MOSFET Load – Enhancement Load, Depletion n-MOS inverter 3.4 CMOS inverter – circuit operation and characteristics and interconnect effects: Delay time definitions	**04/11/2022 TO 23/11/2022**	3.1	Basic nMOS inverters	**04/11/2022**	
					3.2	Working of Resistive-load Inverter	**09/11/2022**	
					3.3	Inverter with n-Type MOSFET Load – Enhancement Load, Depletion n-MOS inverter	**10/11/2022 & 11/11/2022 & 14/11/2022**	

			3.5 CMOS Inventor design with delay constraints – Two sample mask lay out for p-type substrate.		3.4 3.5	CMOS inverter – circuit operation and characteristics and interconnect effects: Delay time definitions CMOS Inventor design with delay constraints – Two sample mask lay out for p-type substrate.	**17/11/2022 & 18/11/2022** **21/11/2022 & 23/11/2022**	
4	Static Combinational, Sequential, Dynamics logic circuits& Memories	**15**	4.1 Define Static Combinational logic ,working of Static CMOS logic circuits (Two-input NAND Gate) 4.2 CMOS logic circuits (NAND2 Gate) 4.3 CMOS Transmission Gates(Pass gate) 4.4 Complex Logic Circuits - Basics 4.5 Classification of Logic circuits based on their temporal behaviour 4.6 SR Flip latch Circuit, 4.7 Clocked SR latch only. 4.8 CMOS D latch. 4.9 Basic principles of Dynamic Pass Transistor Circuits 4.10 Dynamic RAM, SRAM, 4.11 Flash memory	**24/11/2022 TO 21/12/2022**	4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 4.10	Define Static Combinational logic ,working of Static CMOS logic circuits (Two-input NAND Gate) CMOS logic circuits (NAND2 Gate) CMOS Transmission Gates(Pass gate) Complex Logic Circuits - Basics Classification of Logic circuits based on their temporal behaviour SR Flip latch Circuit Clocked SR latch only. CMOS D latch Basic principles of Dynamic Pass Transistor Circuits Dynamic RAM, SRAM	**24/11/2022 & 25/11/2022** **28/11/2022** **30/11/2022** **02/12/2022 & 05/12/2022 & 07/12/2022** **08/12/2022** **09/12/2022** **12/12/2022** **14/12/2022** **15/12/2022 & 16/12/2022** **19/12/2022**	

					4.11	Flash memory	**21/12/2022**	
5	System Design method & Synthesis	**04**	5.1 Design Language (SPL & HDL)& HDL & EDA tools & VHDL and packages Xlinx 5.2 Design strategies & concept of FPGA with standard cell based design 5.3 VHDL for design synthesis using CPLD or FPGA 5.4 Raspberry Pi - Basic idea	**23/12/2022 & 30/12/2022**	5.1 5.2 5.3 5.4	Design Language (SPL & HDL)& HDL & EDA tools & VHDL and packages Xlinx Design strategies & concept of FPGA with standard cell based design VHDL for design synthesis using CPLD or FPGA Raspberry Pi - Basic idea	**23/12/2022** **26/12/2022** **28/12/2022** **30/12/2022**	
6	Introduction to Embedded Systems	**10**	6.1 Embedded Systems Overview,list of embedded systems,characteristics ,example – A Digital Camera 6.2 Embedded Systems Technologies--Technology – Definition -Technology for Embedded Systems -Processor Technology -IC Technology 6.3 Design Technology-Processor Technology,General Purpose Processors – Software, Basic Architecture of Single Purpose Processors – Hardware 6.4 Application – Specific Processors,Microcontrollers,Digital Signal Processors(DSP) 6.5 IC Technology- Full Custom / VLSI,Semi-Custom ASIC (Gate Array & Standard Cell), PLD (Programmable Logic Device) 6.6 Basic idea of Arduino micro controller	**02/01/2023 TO 20/01/2023**	6.1 6.2 6.3 6.4 6.5	Embedded Systems Overview, list of embedded systems, characteristics ,example – A Digital Camera Embedded Systems Technologies--Technology – Definition -Technology for Embedded Systems -Processor Technology -IC Technology Design Technology-Processor Technology, General Purpose Processors – Software, Basic Architecture of Single Purpose Processors – Hardware Application – Specific Processors, Microcontrollers, Digital Signal Processors(DSP) IC Technology- Full Custom / VLSI, Semi-Custom ASIC (Gate Array & Standard Cell), PLD (Programmable Logic Device)	**02/01/2023** **04/01/2023 & 06/01/2023** **09/01/2023 & 11/01/2023 & 12/01/2023** **13/01/2023 & 16/01/2023** **18/01/2023**	

					6.6	Basic idea of Arduino micro controller	**20/01/2023**	

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