

GOVERNMENT POLYTECHNIC, SAMBALPUR, RENGALI

DEPARTMENT OF E&TC ENGINEERING

LESSON PLAN

SUBJECT- VLSI & EMBEDDED SYSTEM(TH-2)

SEMESTER-5TH

NAME OF THE FACULTY- MS. S. SUBHALAXMI

TOTAL NO. OF PERIODS-60(4/W)

UNIT	DATE	PERIOD	TOPICS TO BE COVERED
1	August 1 st week		Introduction to VLSI & MOS Transistor
		1	Historical perspective- Introduction
		2	Classification of CMOS digital circuit types
		3	Introduction to MOS Transistor& Basic operation of MOSFET
		4	Structure and operation of MOSFET (n-MOS enhancement type) & CMOS
		5	MOSFET V-I characteristics
		6	Working of MOSFET capacitances.
		7	Modelling of MOS Transistors including Basic concept the SPICE level-1 models, the level-2 and level-3 model
		8	Flow Circuit design procedures
		9	VLSI Design Flow & Y chart
		10	Design Hierarchy
		11	VLSI design styles-FPGA, Gate Array Design, Standard cells based, Full custom
12	Previous year questions discussion & assignments.		
2	August 4 th week		Fabrication of MOSFET
		1	Simplified process sequence for fabrication
		2	Basic steps in Fabrication processes Flow
		3	Fabrication process of nMOS Transistor
		4	CMOS n-well Fabrication Process Flow
		5	MOS Fabrication process by n-well on p-substrate
		6	CMOS Fabrication process by P-well on n-substrate
		7	Layout Design rules
		8	Stick Diagrams of CMOS inverter
		9	Previous year questions discussion
10	Numerical problems & assignments		
3	September 3 rd week		MOS Inverter
		1	Basic nMOS inverters
		2	Working of Resistive-load Inverter
		3	Inverter with n-Type MOSFET Load – Enhancement Load
		4	Depletion n-MOS inverter
		5	CMOS inverter – circuit operation and characteristics and interconnect effects
		6	Delay time definitions
		7	CMOS Inverter design with delay constraints – Two sample mask lay out for p-type substrate.
		8	Previous year questions discussion
9	Numerical problems & assignments		

4	October 2nd week		Static Combinational, Sequential, Dynamics logic circuits & Memories
		1	Define Static Combinational logic
		2	working of Static CMOS logic circuits (Two-input NAND Gate)
		3	CMOS logic circuits (NAND2 Gate)
		4	CMOS Transmission Gates (Pass gate)
		5	Complex Logic Circuits – Basics
		6	Classification of Logic circuits based on their temporal behaviour
		7	SR Flip latch Circuit,
		8	Clocked SR latch only.
		9	CMOS D latch.
		10	Basic principles of Dynamic Pass Transistor Circuit
		11	Dynamic RAM
		12	SRAM
		13	Flash memory
		14	Previous year questions discussion
15	Numerical problems & assignments		
5	November 1 st week		System Design method & synthesis
		1	Design Language (SPL & HDL) & HDL & EDA tools & VHDL and packages Xilinx
		2	Design strategies & concept of FPGA with standard cell-based design
		3	VHDL for design synthesis using CPLD or FPGA, Raspberry Pi - Basic idea
		4	Previous year questions discussion & assignments
6	November 4 th week		Introduction to Embedded Systems
		1	Embedded Systems Overview, list of embedded systems, characteristics, example – A Digital Camera
		2	Embedded Systems Technologies--Technology – Definition -Technology for Embedded Systems
		3	-Processor Technology -IC Technology
		4	Design Technology-Processor Technology, General Purpose Processors – Software, Basic Architecture of Single Purpose Processors – Hardware
		5	Application – Specific Processors, Microcontrollers, Digital Signal Processors (DSP)
		6	IC Technology- Full Custom / VLSI,Semi-Custom ASIC (Gate Array & Standard Cell)
		7	PLD (Programmable Logic Device)
		8	Basic idea of Arduino micro controller
		9	Previous year questions discussion
10	Numerical problems & assignments		